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THE PAPER INDUSTRY

A MONTHLY EDUCATIONAL JOURNAL OCTOBER, 1933

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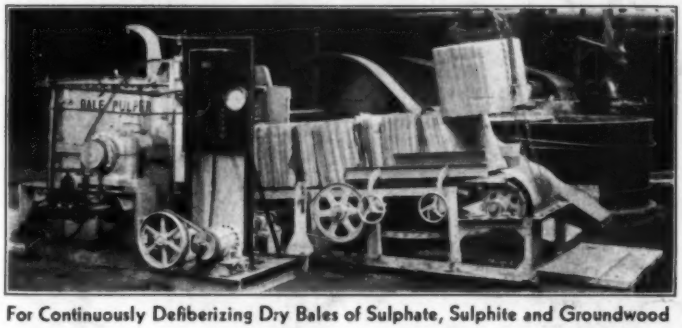
STURTEVANT PRODUCTS

PULP AND PAPER MILL DEPARTMENT

BALE PULPER



For Continuously Defiberizing Dry Bales of Sulphate, Sulphite and Groundwood

HAMMER MILL
For Wet Laps and Preparing Screenings for Refiners

POIRIER WEIGHT GOVERNOR

STONE REFINER
For Sulphite, Sulphate and Groundwood Screenings

SPECIALIZING IN BLEACH AND BEATER FURNISH SYSTEMS

STURTEVANT MILL CO., BOSTON, MASS.

ALKALI HOLDS NO TERRORS

for Pontamine Brown N3G

Of good fastness to alkali, this dyestuff develops full strength even if thrown into the beater dry.

DU PONT DYESTUFFS
REG. U.S. PAT. OFF.

E. I. DU PONT DE NEMOURS & CO., INCORPORATED
Organic Chemicals Department
Dyestuffs Division, Wilmington, Delaware
SALES OFFICES: Boston, Mass., Charlotte, N. C., Chicago, Ill., New York, N. Y., Philadelphia, Pa., Providence, R. I., and San Francisco, Calif. Represented in Canada by Canadian Industries, Limited, Dyestuffs Division, Beaver Hall Building, Montreal, 372 Bay Street, Toronto, Ontario.

PONTAMINE BROWN N3G possesses good fastness to light and alkali. It is also very soluble and develops full strength even if it is put dry into the beater.

This du Pont color is suitable as a base for brown shades, on all grades of paper where fastness to light and alkali is extremely important.

Write for samples of Pontamine Brown N3G today. Tests in your own beaters will bear out the wisdom of adding this color to your list. And remember—we are always ready to help you with any dyestuffs difficulties you may be having.

BELOIT SUCTION ROLLS

ASSURE CLEANER FELTS

ELIMINATE
- Marking
- Crushing
- Shut-Downs
- Felt Troubles
- Pick ups

***and* IMPROVE**
- Finish
- Quality
- Felt Life
- Production

BELOIT IRON WORKS PAPER MACH'Y BELOIT, WIS., U.S.A.

The *Beloit* Way is the *Modern* Way

BELOIT IRON WORKS
Beloit, Wis., U. S. A.

THE PAPER INDUSTRY

OCTOBER, 1933
Vol. XV—No. 7

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

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HIGHER SPEEDS
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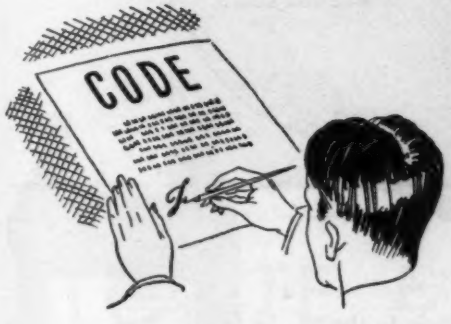
LONGER LIFE
LOWER COST

TENAX felts are designed to give the results you require. It is not an accident—this high record of performance. **TENAX** felts in one and two sided weaves for all types of board machines.

Non-Users Are the Losers

LOCKPORT FELT COMPANY
NEWFANE, NEW YORK

YOU CAN ALL SIGN THIS CODE!



The key to finer stock and lower costs. This Taylor Recording Regulator controls hot and cold grinding at any desired point... produces pulp more uniform in texture, freeness, color and strength.

"Pulp Grinder temperature shall be kept uniform at all times to insure increased production of uniformly high quality stock at lowest cost." Mills carry this out with a Taylor System of Automatic Temperature Control. Read about one test

WHAT WAS once a great problem in paper mills need be a worry no longer.

Pulp grinder temperatures can be kept under complete control. Uniformly high quality pulp, and more of it, can be produced day after day at lower cost than ever before.

A Taylor System of Grinder Temperature Control is all you need. Its value has often been shown. In a recent extensive test by a large plant to determine the effect of hand operation and of Automatic Control on the capacity of a wood pulp grinder, production was increased 9% under automatic control. The system used was Taylor Grinder Temperature Control. This System was the first successful one of its type to be offered by any instrument manufacturer. Its value today is being proved day after day in many Canadian and United States mills. And is now selected to control temperature on 8 new grinders now being installed in what will be the most modern ground-wood mill in this country.

The Taylor Recording Temperature Regulator is the heart of the system. It controls temperature automatically and also gives a daily chart record for constant reference. Its durability and accuracy and money-saving ability make it one of the finest products Taylor Engineers have ever designed.

Subscribe to the Pulp Grinder Code today. Then let us give you complete data on this Taylor System. Write Taylor Instrument Companies, Rochester, N.Y., U.S.A., or Taylor Instrument Companies of Canada, Ltd., Toronto, Canada.

SPECIAL

TAYLOR NEWS FLASH

Beginning October 1st all Taylor Temperature Recorders and Recording Regulators will be shipped in a new die-cast case originated by a noted American product designer. This modern case, with many distinct Taylor improvements in the mechanism of the instrument inside, represents another step in the effort to provide industry with the most up-to-date temperature and control equipment. More later.

NRA

Tycos Taylor

Indicating Recording • Controlling

TEMPERATURE *and* PRESSURE INSTRUMENTS

*The name Taylor now identifies our complete line of products, including Tycos instruments.

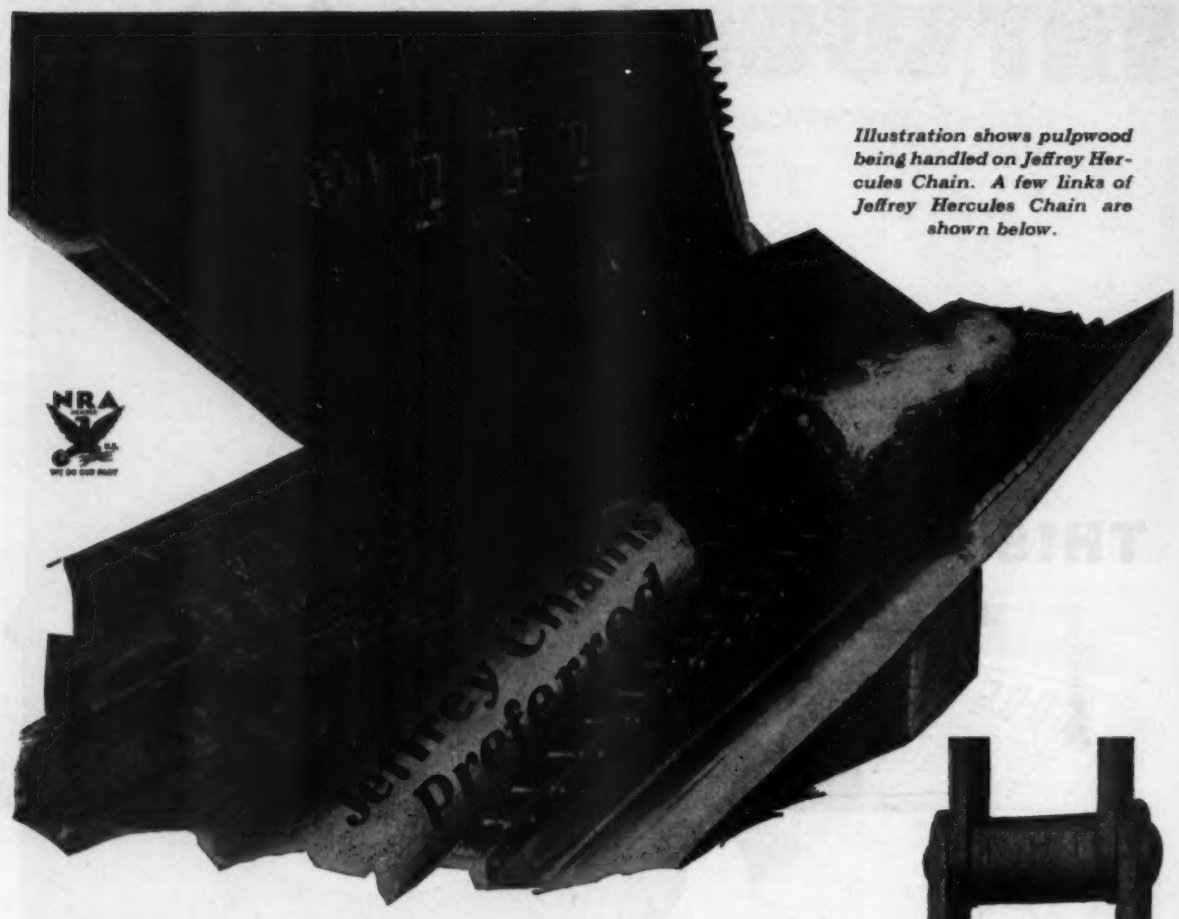
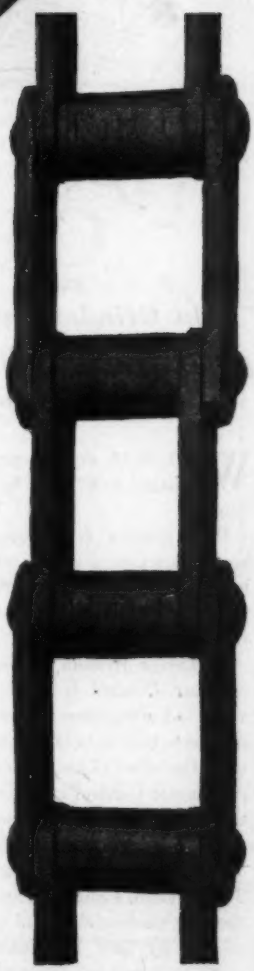


Illustration shows pulpwood being handled on Jeffrey Hercules Chain. A few links of Jeffrey Hercules Chain are shown below.



Jeffrey Hercules Chain is unquestionably the most popular chain in the pulp and paper industry for use on chain conveyors handling pulpwood. It is also used extensively on bucket elevators and as a drive chain, and its enviable reputation is based strictly on merit.

The illustration above shows a Jeffrey Hercules Chain installation in the ground wood mill of a large company which has standardized on Jeffrey Chains because it wants dependable service—continuously.

The features of Jeffrey Hercules Chain are: Strap links of high carbon steel; Malleable iron or Supermal* block links; Barrel of solid link with large pin bearing—extra metal where barrel engages sprocket tooth; D-shank full diameter pins—high carbon steel—locked in strap link confining all wear to long bearing block link.

**Supermal is a new wear-resisting metal. It is "File Hard" yet it retains those desirable qualities of ordinary malleable iron—toughness and ductility.*

If you are interested in lower chain maintenance send for our Chain Catalog which will give you complete details.

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ALOXITE BRAND
REG. U. S. PAT. OFF.

PULP GRINDING WHEELS

ARE BUILT TO ORDER

Made to Meet the Conditions in Your Mill

EVERY wheel we turn out is made to meet certain, definite ground wood mill conditions.

Built to meet the specifications as applied to freeness, strength and screen classification of pulp.

There is no such thing as one wheel which will meet all demands. Every wheel is made with a definite purpose in view—made in the right grit and grade—to produce desired results.

The free, clean cutting action of this wheel plus its ability to remain sharp by holding its burring over extremely long operating intervals insure the production of high quality pulp and the continued duplication of that quality.

Points worth remembering in considering the problem of a greater production of better pulp

THE CARBORUNDUM COMPANY
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NIAGARA FALLS, N. Y.

CANADIAN CARBORUNDUM CO., LTD., NIAGARA FALLS, ONT.

(CARBORUNDUM AND ALOXITE ARE REGISTERED TRADE MARKS OF THE CARBORUNDUM COMPANY)

KREBS PIGMENTS

for Paper Makers

PONOLITH HO — This pigment contains approximately 30 per cent zinc sulphide. It is low in cost and is recommended for use in the manufacture of paper where a high pigmentation is permissible.

TI-TONE P—This is an ideal, all-purpose, medium-priced pigment for increasing opacity. It consists of approximately 85 per cent Ponolith HO and 15 per cent Krebs Pure Titanium Dioxide.

KREBS PURE TITANIUM DIOXIDE—This pigment has a high index of refraction and is the strongest known pigment to impart whiteness and opaqueness to paper.

Krebs white pigments are being used in increasing volume by paper makers to obtain stocks which possess greater opaqueness and whiteness. They are also employed to improve printing surfaces. Paper containing Krebs pigments takes ink evenly and produces clean, sharp printing effects. One of the most popular pigments offered to the paper industry by Krebs is . . .

TI-TONE P

This is a combination pigment which possesses all of the good properties of the zinc sulphide and titanium pigments. It mixes uniformly with pulp in the beater . . . gives an unvarying opaque sheet with a medium percentage of pigments. Ti-Tone P is an excellent pigment for coating purposes. It wets freely with water . . . disperses readily with casein or starch sizes. The replacement of a small percentage of clay with this pigment improves whiteness, opacity of coated paper, and permits reduction of the weight of coating material required per ream.

Paper manufacturers are invited to solicit the aid of the Krebs technical staff to assist them in increasing opacity and whiteness of paper. Upon request samples of Ti-Tone P, Ponolith HO and Krebs Pure Titanium Dioxide, complete information and technical service will be given.

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Main Office: 256 Vanderpool Street, NEWARK, N. J.

Plants: NEWPORT, DEL. NEWARK, N. J. BALTIMORE, MD.

THERE'S A KREBS PIGMENT FOR ALL TYPES OF PAPER

IT DOESN'T COST A CENT

. . . to know the Difference!

It doesn't cost a cent to know the difference between old fashioned rolls with the hard rubber base, and modern Goodrich Vulcalock rolls with soft cushion rubber clear to the core. But it costs real money *not to act* on that knowledge in order to get 40% more cushion wear.

Before Vulcalock—*A hard-rubber-base roll about to be recovered. Note that the soft rubber cushion is worn down to about ¼". The rest is "dead" hard rubber.*

After Vulcalock—*The Vulcalock Roll made exclusively by Goodrich eliminates the hard rubber base, gives you soft rubber cushion from outer surface to metal core.*

THE hard rubber base *used to be* essential, as a binder between cushion surface and metal core. At best the adhesion of hard rubber base to metal core was none too good (not more than 35 pounds per square inch) and the manufacturer frequently had to tamper with the cover compound so that cover and base could be vulcanized at the same time. The layer of soft cushion rubber was limited in thickness and useful life in exact proportion to the thickness of the hard rubber base layer which had no cushioning properties. This meant so much cushion waste. It meant loss of metal through re-roughthreading, added cost of rubber needed to build up the roll to correct outside diameter—every time recovering became necessary; *and shorter life to the roll.*

Then Vulcalock was discovered—an exclusive Goodrich process for bonding rubber directly to metal with an adhesion which exceeds 500 pounds per square inch. By this process Goodrich builds a roll that gives you 100% live cushion rubber clear to the core—40% more cushion wear, longer service between grindings; and by eliminating re-roughthreading preserves the life of the roll. With all these advantages, first cost is practically the same!

When you stop to compare these two types of paper mill rolls, the difference is obvious and startling. Why not do something about it the next time you buy, and specify Goodrich Vulcalock Rolls?—The B. F. Goodrich Rubber Company, Mechanical Rubber Goods Division, Akron, Ohio.

ROLL COVERINGS—BELTING—HOSE—MISCELLANEOUS RUBBER PRODUCTS

Goodrich

ALL *goodness goodness* IN RUBBER

NRA

Vulcalock *Paper Mill Rolls*

"Four to five months' run, without grinding, will pay for the expense of plating"

. . . . . so writes a representative mill in regard to CRODON-plated calender rolls which are still in use after a year's operation

CRODON
The Chrome Plate

PERFORMANCE records of CRODON-plated equipment in regular operation for years show that the application of chromium plate has increased the average useful life many times over. In many instances the plated surfaces still show no sign of wear.

CHROMIUM plate provides protection against wear and corrosion —it produces a remarkably smooth, frictionless surface exceptionally well suited for certain parts of paper mill machinery.

The most successful applications in the paper industry are on suction box covers, screen plates, press rolls, drying drums, printing rolls, calender rolls, embossing rolls, evaporator tubes and numerous other equipment where decreased wear, elimination of corrosion and extreme smoothness are desired. These are described in Booklet No. 6, a copy of which will be furnished upon request.

The trade-mark CRODON assures the best in chromium plate

If you already use CRODON-plated equipment your performance and cost record serve as our accredited representatives. If not, it is well worth while to ask for further information.

Chromium Corporation of America

***Executive Offices*—120 BROADWAY, NEW YORK**

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3125 Perkins Ave.
Cleveland, Ohio

4645 West Chicago Ave.
Chicago, Ill.

187 East Becher St.
Milwaukee, Wis.

The Recovery Plan IS Progressing!

THIS is no time to indulge in doubts as to the ultimate working of the Industrial Recovery Plan.

There is no basis for any alarm; no reason exists for emitting sour diatribes on the NIRA program.

On the contrary, this is the time to throw up your hat and give three rousing huzzas over the progress made so far and the certainty of progress yet to come.

For we are making progress in the war against hunger and depression.

Yes, it is true that the administration enthusiasts predicted that by October 1 there would be five million re-employed wage earners back at work. They did overestimate it—but 815,000 men went back to work during August and a total of over two million men are back on pay rolls since March 15. That's progress with a big "P".

It is true that the cost of living has been rising, but offsetting it is an increase of 30 per cent in employment in manufacturing industries and a 55 per cent increase in payrolls, plus the fact that other fields of employment show approximately similar gains.

Again, note the progress made in recovery with a still larger "P".

Are we going to allow the disappointment in the re-employment figures to obscure the marvelous achievement in putting two and one-half million men back to work?

Is half a loaf actually in your hand of less value than a whole loaf predicted but not realized?

The whole matter resolves itself down into one factor—we expected greater returns from the plan than could possibly be realized so quickly from so vast an undertaking.

Industrial business was so much sicker than even the best diagnostician ever dreamed of—besides that, all the in-laws of business were contaminated with the same insidious, depressive, non-profit-making malady.

It is the slow-up of recovery that has demonstrated the virulence of the disease.

We know now that the whole gamut of business, industry and their manifold divisions, finance, manufacturing, agriculture, politics, taxing and the like must be thoroughly overhauled; that their operations must be reviewed and revamped from the old ox-cart days and attuned to the age of motor and airplane transport era. The economic doctors, internes, nurses and assistants have a big continuation job of convalescence ahead of them. Business has been a very sick man—been getting sicker and sicker for years back. The crisis was reached on March last. Then, the turn came. The patient responded and did a big spectacular come-back in the initial months, and now, we have come to the convalescent—the resting period—in which the right concoctions, brews and treatment for administration and for the purpose of providing permanent strength, ***must be gone through.***

Is the patient in any danger of relapse? None whatever. He progressed fast at first, now ***slower,*** but ***surer.***

It is the natural working of the laws of recovery.

Perhaps right here would be the moment to introduce the expert opinion of an eminent outside practicing European diagnostician:

"Paris, September 1—An excellent bill of health

was given American economy today along with a grave warning to Europe by Senator Henri Berenger, eminent French financial authority, former Ambassador to the United States and co-author of the Mellon-Berenger war debt treaty.

"The financial situation of the United States is so sound fundamentally," Berenger said, "that even worse for France and other gold countries than the devaluation of the dollar, will be the rush of funds to the United States when it climbs back on the gold standard.

"A sudden repatriation of masses of reappreciated dollars can cause such difficulties that European currencies will be seriously staggered, if not caught up in catastrophe.

"The United States dollar is worth more than the 18 francs paid for it today. Its former gold coverage has not changed and is still there. The dollar remains the strongest in the world compared to any other currency."

Again, we say this is no time to have doubts and utter criticisms of our own hard working intelligent doctors. Their patients are improving and progressing. Recovery is not to be achieved in a year—the cause of the disease is to be found and eliminated. That takes time. The progress already made gives assurance that we are proceeding along right lines. The primary object is more jobs, more payrolls, more employment. That is being achieved.

The ultimate object is the permanent cure. The permanent provision of permanent employment at decent wages for every man who wished to work in this country, paid in currency which Doctor Berenger of France says is the best and soundest in the world.

Throw up your hat and cheer over the progress made! Contrast the condition of business on March 1, 1933 and October 1, 1933. You must admit we have progressed and because of that progress are going into a bigger, better, sounder recovery ahead.

Your minimum contribution to the cause is active, cheerful confidence in the recovery plans. The doctors can't do it all. The in-laws must assist and they are the final beneficiaries.

Wisconsin—A Leader in Pulp and Papermaking Research

WISCONSIN has long been recognized as one of the foremost pulp and paper producing states of the country. The fame of its mills of the Fox River and Wisconsin River valleys has spread to every papermaking section of the country and even into foreign countries. In fact, it is possible to find pulp and papermakers in nearly every state in the union in which pulp and paper is produced who received their early training in one or more mills of the Badger State.

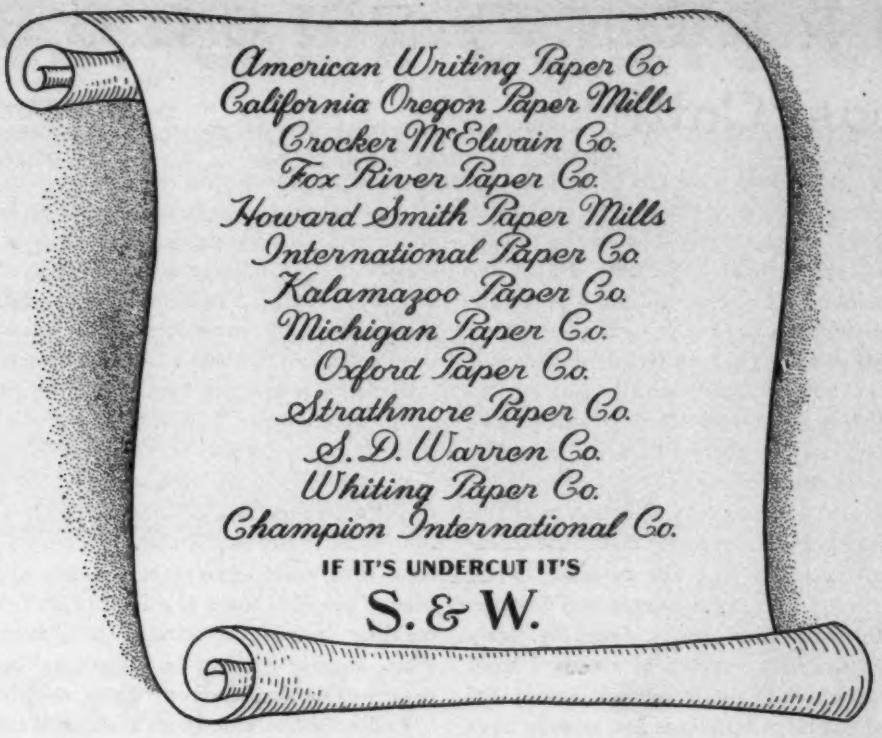
These men have done much to disseminate information on the activities of the industry within the State as well as to promote the development of more efficient methods of production. At the same time, for a number of years the U. S. Forest Products Laboratory at Madison, Wis., has conducted researches on many subjects of interest to pulp and papermakers and has revealed its findings to the trade through the use of printed bulletins, or the trade press, or through the presentation of papers on some of this work before various association conventions. The most recent evangel of the Wisconsin industry is, perhaps, the Institute of Paper Chemistry, which is a post-graduate and research institution affiliated with Lawrence College at Appleton.

With all that has been done to emphasize the importance of the state as a factor in the pulp and papermaking industry, it is believed that no single stroke had greater force in this direction than the program of the recent fall meeting of T. A. P. P. I., which was held during the past month in Appleton. This convention proved to be an actual demonstration of the part being played by the U. S. Forest Products Laboratory and by the Institute of Paper Chemistry in studying some of the important technological problems that are at present confronting the industry.

Of twenty-four technical papers actually presented at this convention, five were by members of the Institute staff or by recent graduates, and thirteen were by staff members of the U. S. Forest Products Laboratory.

It would be difficult to estimate the effort and the time spent on the research work which culminated in the presentation of these various papers, but each paper contained factual data based on experience and research that is of fundamental importance to the industry. Some of this data is of such character that it is of immediate practical significance. The rest of it may point the way to future research that may prove of untold benefit. At any rate, work of this kind is taking much of the guesswork out of papermaking and is placing the industry as a whole on a more scientific basis.

Real credit, it seems, is due to these two agencies located within the State of Wisconsin, and to other agencies, some within and some without the State, that are permitted to give to the world such data of fundamental character as is revealed to them through the light of modern research.



Talk with those Mills *that use them*

Every mill mentioned above has installed more than one Undercut. Some have 30 or more in operation for accurately finishing their paper. It is not mere chance that many of these mills are recognized leaders in their section. Talk with them—find out for yourself why shrewd purchasers most often specify Undercuts.

Send for names of mills near you that use Undercuts, also free illustrated bulletin that describes Dual Control and 12 other features exclusive to users of these trimmers.

★

The SMITH & WINCHESTER Manufacturing Company

7

PLANT AND OFFICES AT SOUTH WINDHAM, CONNECTICUT

The Last Call!

By WILLIAM SIBLEY

ON October thirty-first the gates of "A Century of Progress" which has been the mecca for millions of people from all over the world during the past four months will close. Have you seen that Exposition? If not, we sincerely urge that you put on your best bib and tucker and come. This is the last call. If you don't see it this month, you will never see it, because, contrary to prevalent rumor, when the gates close at midnight October thirty-first, they will remain closed to everyone except workmen assigned the job of dismantling the buildings.

There are several reasons why the Fair will not be continued next year. In the first place, the buildings were constructed to last six months. They wouldn't last through a severe winter and another summer if the Commission wished it. Secondly, many of the buildings were constructed of standard sized steel beams which are high in salvage value; the steel in three of the large buildings has already been bought by large firms with delivery promised the month of April. Thirdly, while the Commission will not lose money on the Fair this year, the attendance and volume of money made are not large enough to permit the obligation of a second year's exposition. So don't let current rumor fool you into believing that you can see the Fair next summer—it won't be there.

No one should assume the responsibility for telling you *why* you should visit the Fair. This exposition is so diverse, so all-inclusive, that each visitor makes his own why. To some the Fair is simply "Roxy's idea of Coney Island." To others, it is a veritable college education. Visitors get out of the Fair a reaction proportionate to what they bring to it. If one is chiefly interested in boob-traps and carnivaleria, the Midway, Hollywood and other areas within the grounds afford just that sort of thing. If one's primary interest lies in chemistry, biology, geology, transportation, electricity, communication, radioactivity, evolution, manufacturing, or whatnot—that one will find at the Fair more of both elementary and complex exhibits along these lines than he can absorb in a week's study.

There is no gainsaying the fact that the Fair holds much for everyone. From the Enchanted Island for the little tots, through Ripley's "Believe It Or Not" Odditorium, the 49 Gold Camp and the Drive-'Em-Urself motor boats for the vigorous boy scouts and camp-fire girls, to model homes for the housewives, egg-laying contests for the farmers, a pageant of transportation for the railroad man, papermaking and paper using for the papermaker, a diamond mine for the jeweler, a complete Hall of Religion for the theologist, manufacturing plants and assembly halls for the industrialist, transformers in cross-section for the electrician, "scrambled speech" for the communicationist, flowers and foreign plants for the horticulturist, prehistoricisms for the evolutionist, delineations of every known race for the anthropologist—the recitation becomes fatiguing.

But more than the exhibitions of physical progress there is to be found abundant evidence of social progress. The visitor who stops to think will realize that here at the Fair there is a Hall of Religion—a single building housing a number of different religious sects, each in its own booth not unlike a manufacturer's exhibit at a convention or show.

And only one block north of the Hall of Religion, which houses sects still definitely fundamental in principle, one may find in the Hall of Science almost countless displays and exhibits of evolution—definite physical, irrefutably scientific evidence of evolution—which would have been torn down and thrown angrily into Lake Michigan and their builders ostracized from society, even as late as Bryan's day.

Across the Lagoon, one finds countless indications of what the future will bring. One sees exactly how radio transmission may be made secret—how far distant, or really close at hand, are such developments as the radio broadcasting of power, heat and light, as well as sound. On this Island, one may gain the observation tower of the Sky Ride, which is the equivalent of 65 stories in height, and from there see a display of electricity—an exhibit of illumination thus far unequalled in the history of man. . . . And just one mile from that steel tower, in the Art Institute of Chicago, has been assembled for the pleasure of visitors to the exposition, the greatest collection of pictures ever housed under one roof. This art exhibit has come from 31 different institutes and museums, and from 156 private collections. Perhaps never again, at least in the lifetime of most of us, will there be such another exhibit.

For many of us, another such spectacle as "A Century of Progress" will never be staged. That is why, right now, we want to issue to our readers the last call to attend this exposition.

Silent Chain COSTS LESS

75 H.P. Link-Belt Silent Chain Drive operating beaters on 4-ft. centers.

because:

Link-Belt Silent Chain Drive

1 The driving action of Link-Belt Silent Chain is as positive as a gear.

Certainly this can not be said of belts, and ropes.

2 Link-Belt Silent Chain cannot slip. It absolutely maintains a fixed relation between driver and driven shafts and keeps production up to a predetermined rate.

All belt drives creep or slip, depending upon conditions, and this means a loss of power and a loss in production.

3 Link-Belt Silent Chain delivers power uniformly over the width of the chain.

With multiple ropes it is not so easy to tell which ones are carrying and which are shirking their load. The result is loss of power.

4 The smooth uniform action of Link-Belt Silent Chain continues throughout the life of the drive. It is just as efficient after 10 or 20 years' work as it was when it was first put on.

All other types of drives decrease in efficiency with use.

Link-Belt Silent Chain Drives have many points of superiority. They are made in sizes from ¼ to 1000 H.P., and over. Drives ½ to 60 H.P. are carried in stock by distributors. Send for Silent Chain Drive Data Book No. 125 and Stock List No. 725.

Link-Belt Positive Drives Include:

Silent Chain Drives	Worm Gear Speed Reducers
Roller Chain Drives	Herringbone Gear Speed Reducers
P. I. V. Gear (Positive, Infinitely Variable Speed Transmission)	Chain Drives of all types (Malleable Iron, Promal or Steel)
Herringbone Gears	Flexible Couplings
	Catalogs sent upon request

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Philadelphia Plant: 2045 W. Hunting Park Ave.
San Francisco Plant: 400 Paul Ave.
Toronto Works: Eastern Ave. and Leslie St.
Offices in All Principal Cities

4822

LINK-BELT
POSITIVE
SILENT CHAIN DRIVES

The superior finishing qualities of Perkins Calender Rolls are the natural result of the longest and broadest experience in the highly specialized art of making calender rolls.

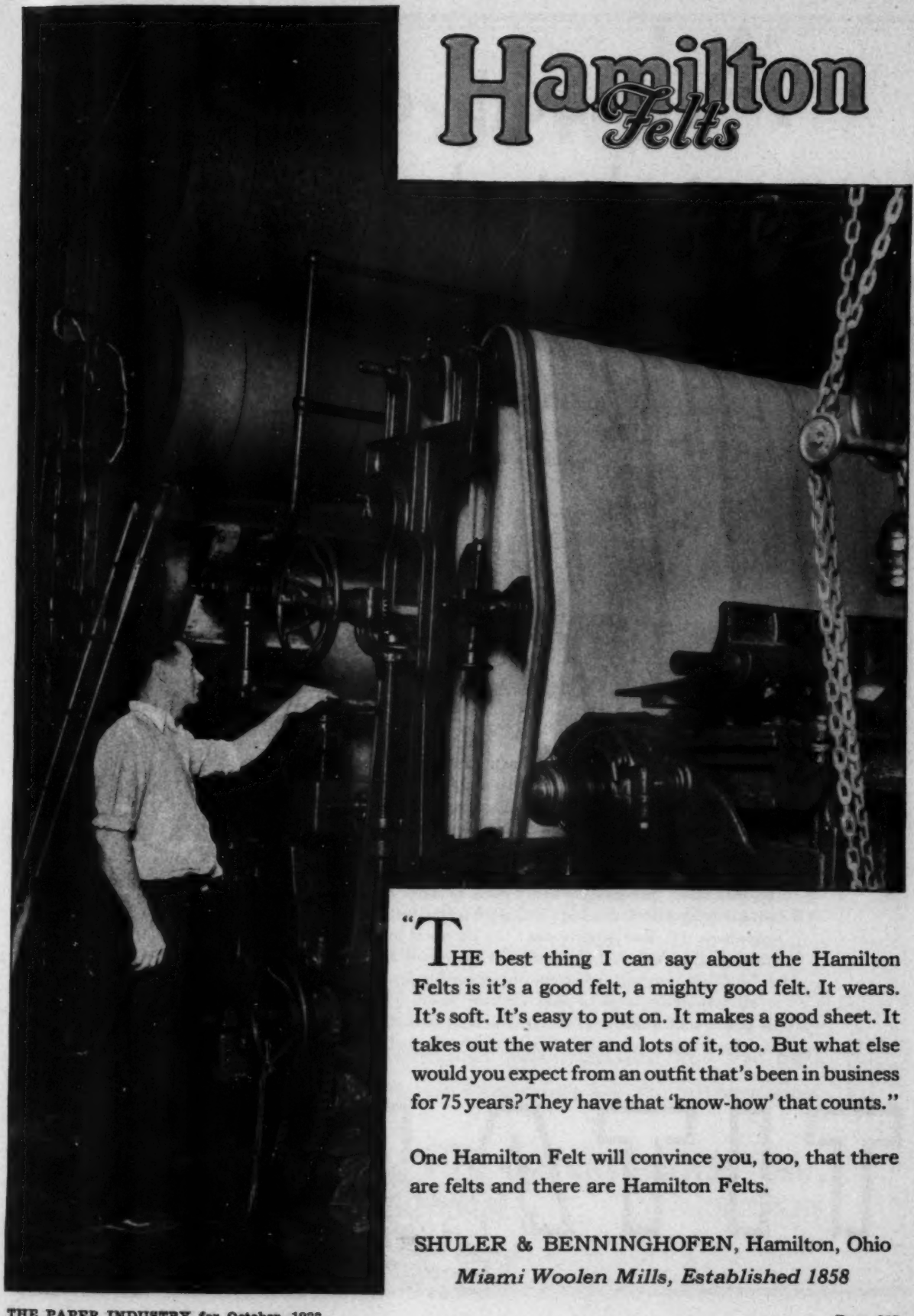
Refills and remakes include the rolls of any manufacture, domestic or foreign, for any application in the paper industry.

B. F. PERKINS & SON, INC., HOLYOKE, MASS.

Engineers and Manufacturers

NO CALENDER CAN BE BETTER THAN THE ROLLS IN IT

Hamilton Felts



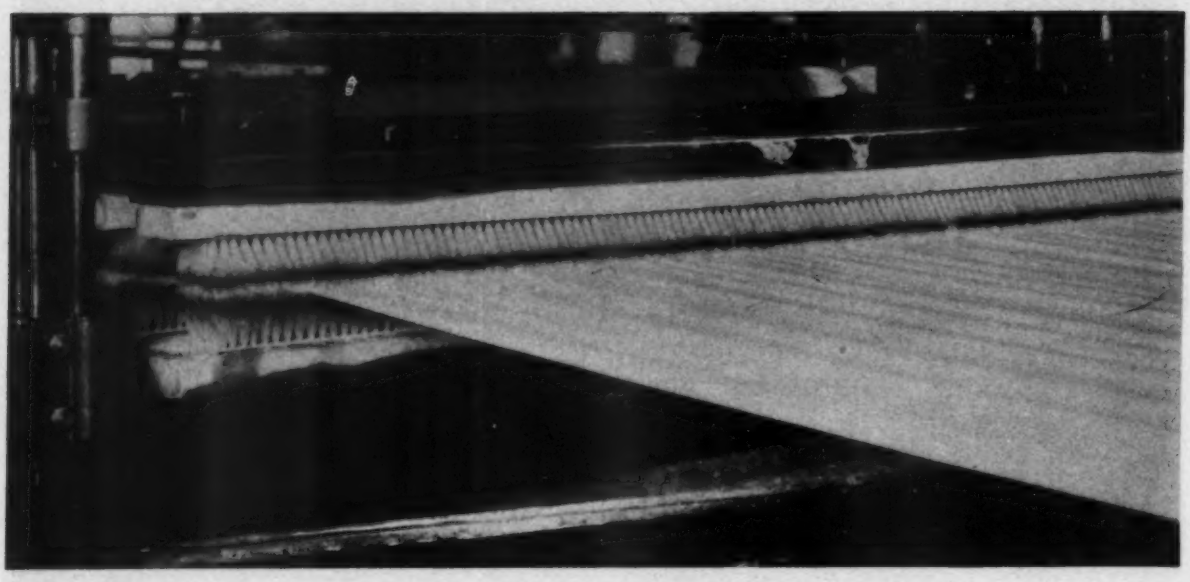
"THE best thing I can say about the Hamilton Felts is it's a good felt, a mighty good felt. It wears. It's soft. It's easy to put on. It makes a good sheet. It takes out the water and lots of it, too. But what else would you expect from an outfit that's been in business for 75 years? They have that 'know-how' that counts."

One Hamilton Felt will convince you, too, that there are felts and there are Hamilton Felts.

SHULER & BENNINGHOFEN, Hamilton, Ohio

Miami Woolen Mills, Established 1858

"A smooth, even coating for coated stocks"



● That's what production men are saying about Titanox-B (barium base). This fine white pigment does not clog nor thicken in the machine because it has excellent mixing and dispersing qualities. It can be easily mixed with china clay, satin white or blanc fixe to produce stocks that are whiter and more opaque. • For making super and coated stocks of both light and medium weights, Titanox-B (barium base) produces better results because it offers these important properties: (1) high index of refraction; (2) remarkable brightness; (3) fine particle size; (4) chemical inertness; (5) high bulking value. • You'll also find that Titanox-B is uniform in color and particle size and free from objectionable foreign matter. Tests at all important steps of manufacture insure a product of highest purity and quality. • Let our research staff cooperate with you in improving your stocks. Write today for helpful information.

TITANIUM PIGMENT CO., INC.
Manufacturers of
TITANOX-B (Barium Base)
TITANOX-C (Calcium Base)
PURE TITANIUM OXIDE

111 Broadway, New York, N. Y.; Carondelet Station, St. Louis, Mo.; Pacific Coast Distributor: National Lead Co. of Calif., 2240 24th Street, San Francisco, California; Canadian Distributor: Wilson, Paterson, Gifford, Ltd., 101 Murray Street, Montreal—132 St. Helen's Avenue, Toronto, Ontario.

TITANOX

Eventually You Will Use a Fritz Refiner

SOME years ago a well-known firm advertised the slogan, "Eventually, Why Not Now!" This advertising applied to flour, but the same thought applies equally well to the refining of stock for making paper.

After using old methods, and then trying out some new ones, if you really want to improve your product and do it at less cost, or, in other words, make money, you must of necessity use a FRITZ REFINING MACHINE, because it will refine your stock better at less cost than any other machine, whether this stock is old papers, rope, sulphite, soda or sulphate.

If you are not interested in making a better product at less cost, then you are not interested in this machine. But if you want a profit for your stockholders, then you should look into the possibilities of this machine in your mill. No obligation to ask for information.

LOVE BROTHERS, Inc.
AURORA ILLINOIS

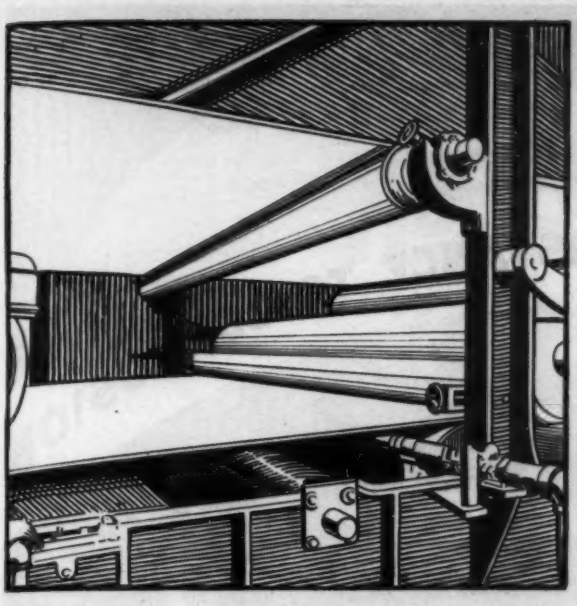
$500
REWARD

will be paid to the person supplying me or the local police, with the first information leading to a successful prosecution of any person or firm manufacturing paper outside the Irish Free State, bearing the watermarked words:

"WARRANTED IRISH MADE SWIFT BROOK PAPER MILLS LIMITED"

Philip O'Reilly,
Solicitor,
1 Upper Ormond Quay,
Dublin, I. F. S.

Only letters concerning this reward should be sent to the above address



From Vats to Winders

Nothing else on a paper machine is subjected to the punishment the felts are called upon to withstand.

No felt, however good, ever serves for any great stretch of time, although Orr Felts have demonstrated their ability to wear appreciably longer than felts they have supplanted.

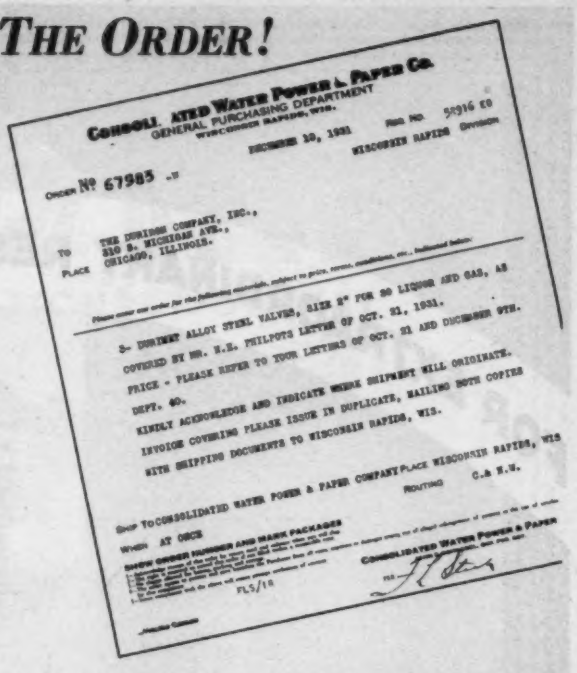
Try Orrs. With them you will obtain maximum water removing service and an extra measure of endurance that will surprise you.

The Orr Felt and Blanket Co.

Piqua, Ohio

ORR FELTS

THE ORDER!



CONSOLIDATED WATER POWER & PAPER CO.
GENERAL PURCHASING DEPARTMENT
WISCONSIN RAPIDS, WIS.

DECEMBER 30, 1931 — WISCONSIN RAPIDS Division

ORDER № 67985 -U

TO THE DURIRON COMPANY, INC.,
PLACE 830 S. MICHIGAN AVE., CHICAGO, ILLINOIS.

3- DURIMET ALLOY STEEL VALVES, SIZE 2" FOR SO LIQUOR AND GAS, AS COVERED BY MR. H.E. PHILPOTS LETTER OF OCT. 31, 1931.
PRICE - PLEASE REFER TO YOUR LETTERS OF OCT. 31 AND DECEMBER 9TH.
DEPT. 60.
KINDLY ACKNOWLEDGE AND INDICATE WHEN SHIPMENT WILL ORIGINATE.
INVOICE COVERING PLEASE ISSUE IN DUPLICATE, MAILING BOTH COPIES WITH SHIPPING DOCUMENTS TO WISCONSIN RAPIDS, WIS.

Ship TO CONSOLIDATED WATER POWER & PAPER COMPANY PLACE WISCONSIN RAPIDS, WIS
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WHEN AT ONCE
SHOW ORDER NUMBER AND MARK PACKAGES

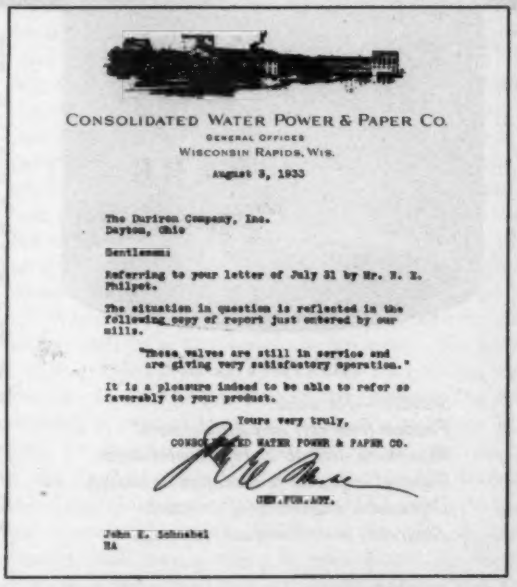
FLT/16

CONSOLIDATED WATER POWER & PAPER

Durimet Valves for SO_2

". . . giving satisfactory operation"

THE PROOF!



CONSOLIDATED WATER POWER & PAPER CO.
GENERAL OFFICES
WISCONSIN RAPIDS, WIS.

August 3, 1933

The Duriron Company, Inc.
Dayton, Ohio

Gentlemen:

Referring to your letter of July 31 by Mr. H. E. Philpot.

The situation in question is reflected in the following copy of report just entered by our mills.

"Those valves are still in service and are giving very satisfactory operation."

It is a pleasure indeed to be able to refer so favorably to your product.

Yours very truly,
CONSOLIDATED WATER POWER & PAPER CO.
GEN. PUR. AGT.

John E. Zehnsbel
HA

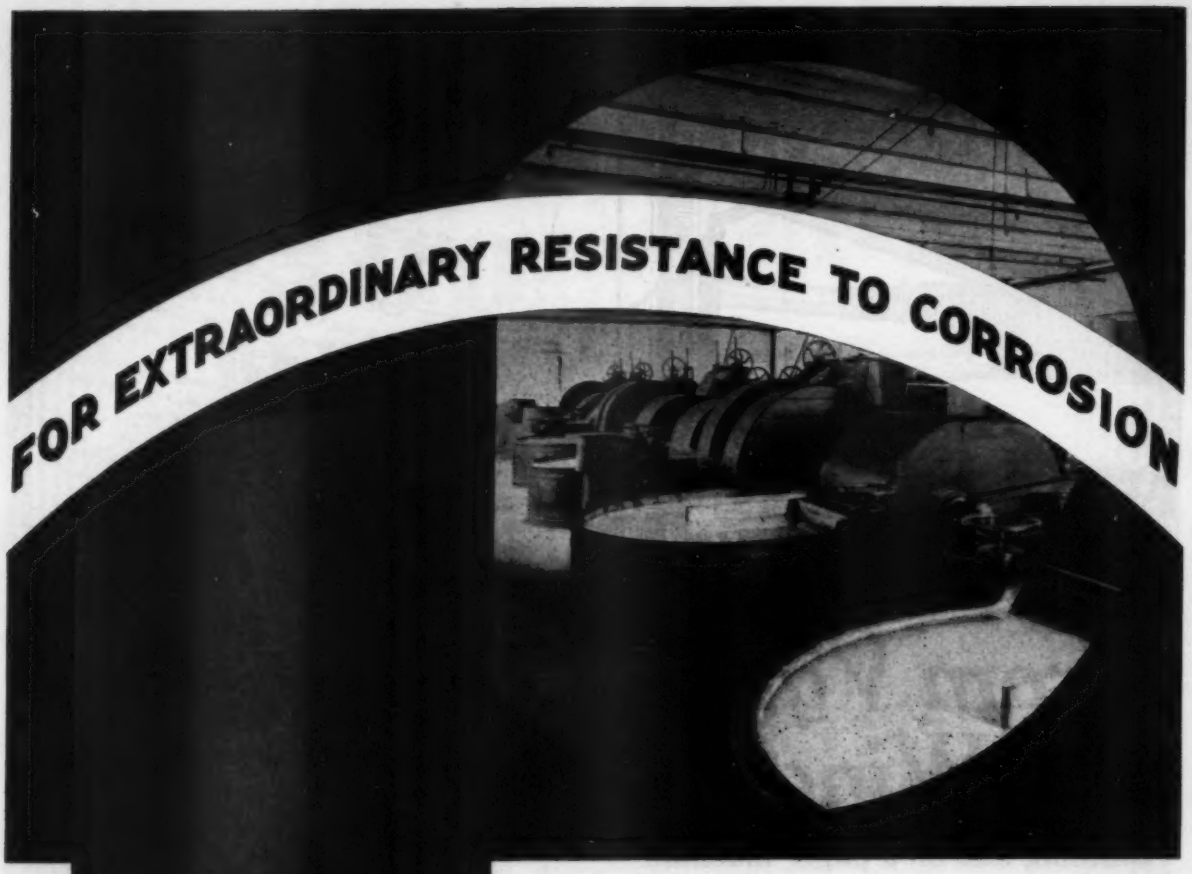
The DURIRON COMPANY, Inc.

Exclusive Licensees for the U. S. for the Manufacture and Sale of the Ponst Strainer

444 N. Findlay St. Dayton, Ohio

DURIMET

FOR EXTRAORDINARY RESISTANCE TO CORROSION



Heater coils, digester relief lines, pulp stock lines, bleaching tank piping, and similar pipe lines will give much longer service if made from NATIONAL U S S 18-8 Stainless and Heat Resisting Pipe and Tubes. This superior material is made by the seamless process from the finest quality electric-furnace steel of chromium-nickel alloy and affords a resistance to corrosion never before experienced. Repairs and replacements are reduced to a minimum when NATIONAL Stainless Pipe and Tubes are used. This is a report of experience. You, too, can secure the same results in your plant with these tubes. Try them and find from your own experience the new measures of safety, economy, and durability resulting from their use.

Available in a wide range of diameters, wall-thicknesses, and lengths. Can be easily bent, welded, or otherwise fabricated. Produced with unrivaled facilities, by the largest manufacturer of tubular products in the world, offering a complete piping service to the paper industry. NATIONAL engineers and metallurgists will be glad to aid in determining the best application to any particular requirement.

ADVANTAGES

Seamless—No welds.
Freedom from rust and discoloration.
Maximum strength at high temperatures.
Unusual resistance to oxidation or scaling.
Dependable uniformity of structure.
Accurately controlled heat treatment.

U S S Chromium-Nickel Alloy Steels are produced under the licenses of the Chemical Foundation, Inc., New York, and Fried. Krupp A. G. of Germany.

NATIONAL TUBE COMPANY Pittsburgh, Pa.

Visit the exhibits of the Subsidiary Manufacturing Companies of United States Steel Corporation, in the GENERAL EXHIBITS BUILDING—A CENTURY OF PROGRESS EXPOSITION, *Chicago.*

NATIONAL USS STAINLESS
AND HEAT RESISTING PIPE AND TUBES

THE PAPER INDUSTRY

A MONTHLY EDUCATIONAL JOURNAL

N. R. A. Codes . . . . . and after that, WHAT?

By O. C. SCHOENWERK
Pulp and Paper Mill Engineer

TODAY all paper and pulp mill executives are busy arranging codes, etc., to suit government requirements and orders, and watching their fellow executives for the next move along these lines.

However, after all this is settled, will the old mill fit in? Will the codes solve all our problems? Hardly! Can executives now sit back and expect smooth sailing? Will inefficient mills find the code arranging their affairs so as to handicap the better mills to pull them down to the same level? Hardly. It cannot possibly work out that way, and while it may allow the old inefficient mill to exist for a short while, it will also mean greater profit for the better mill with still greater chance for improvement by the better mill, due to this greater profit, so that shortly when conditions settle down again—as they surely will—the inefficient plant will be entirely out of the field.

In other words, unless mills take advantage of the golden opportunity to better their equipment and methods, they will have lost pace and dropped to a point beyond recovery.

Someone may ask: What have our executives been doing? Sitting idly by? By no manner of means. Our executives have grown gray watching costs, cutting costs, checking raw material, labor, rechecking, and what not, but a great many in their anxiety to keep down costs have also kept down replacements and renewals to the danger point.

Do we not lose our sense of perspective in our continual check around? Are we not apt to overlook some glaring defect due to familiarity? Does a manager hard pressed like to recommend changes or improvements? In checking our mill, are we not apt to note only the outstanding, glaring, surface defects . . . stock losses, etc.? Do we check possible power loads, excessive use of water, dirt—one of the big troubles in the making of a high grade product? By elimination of dirt alone, a great deal can be done to improve our selling prices with resultant improved net returns. Eliminating dirt very often means only some simple alteration at nominal expense.

In so many cases, sadly needed improvements are delayed and ultimately not carried out due to apparent lack of funds. *Apparent,* because the cost of such improvements is being spent daily in waste, in poor product and in resultant poor return.

This brings up the phase of the engineer—trained to observe—entering the mill as an outsider with no prejudice or habit of production of the particular mill, to analyze and plan and recommend improvements to fit conditions of this specific mill and the relation to its best possible net return product.

Many executives and mill managers consider it a reflection on their ability to call in an outside engineer to check conditions. This certainly should not be the case. When we are ill and our bodies are in poor shape, we call in a physician, do we not? We do not feel this a reflection on our ability in relying on a specialist. Is not the position of the engineer the same in relation to our mill? Any reputable engineer is as anxious to co-operate and get results as any doctor.

In the final analysis, all credit goes to the management as the most important part of its job is to pick proper personnel, capable of doing the job at hand. The actual mill management is, and should be, far too busy getting out a product of proper quality and tonnage to concentrate on needed improvement of equipment, method, etc. and designing changes which require specialized knowledge.

So often one finds a mill anxious to cut costs, building its own equipment which is only partially efficient and then spending valuable production time and a lot of extra money in ironing out kinks that regular equipment manufacturers have all worked out and solved. Much of this is done by mill managers who

cannot get an appropriation from those higher up, resulting in higher cost put on the books in a different manner.

The master mechanic in his anxiety to make his job important—a very natural trait—does the job without any special training, in most cases trying honestly and hard to do a first-class job, and figures only labor and material, leaving overhead out of it entirely.

The author has so often heard the statement—"well, we have to have these maintenance men anyway, so why not let them do this work and design and build our own equipment." The job is done on their estimate, and if it overruns, well—too bad. An outside vendor would have made a set price and would have had to stand by same. Why have these maintenance men around in numbers sufficient to build equipment? Does any man knowingly work himself out of a job? Not so one can notice. Result: build something for the mill to keep busy. How often does mill management figure a maintenance man's proper place in the mill's cost scheme. Very seldom. No maintenance man is making money for his mill unless he is sitting down doing nothing at all. The moment he starts a job, he is an expense item entirely—both in his labor and cost of material, to say nothing of loss of production cost.

In operating a very large mill, the author found it economical to absolutely limit the number of maintenance men to a very few, with the understanding that these men would not be taken to task if found sitting around, nor would they be cut further; it was strictly understood their work was to keep the plant going. The result was their jobs were done in a permanent manner and costs went down. These men watched operators carefully to check abuse and save themselves work. Result: further savings. Also by relying entirely on outside sources for new equipment and major repairs, a decided drop in costs resulted.

Is not the question of funds for rehabilitation overemphasized? The proper recommendation will pay good dividends—this can be proved. Experience has shown that changes of the proper kind can be made to carry themselves easily. The engineer and the vendor of equipment will co-operate to do the necessary work and defer payment until returns are earned by the mill. In other words, they would be willing to go along as partners until changes are paid for.

Never before has it been so necessary to step up the mill, improve product by using proper equipment and method, and no better time could be selected to put such changes into effect.

Never before has it been as necessary for a mill executive to avail himself of any and all assistance possible to bring his plant to top-notch condition to meet the highly competitive situation that is bound to arise in the very near future.

Optical Characteristics of Paper

By E. S. BISSELL
Bausch & Lomb Optical Co.

ALL NATURAL fibers have the property of transmitting light more rapidly in one direction than in another. The greatest refractive index of papermaking fibers is parallel to their length. This index has a value of approximately 1.560; while the lesser refractive index, corresponding to the short dimension of the fibers, has a value of about 1.528. The mean refractive index value is generally assumed to be approximately 1.533.

This refractive index of fibers is fairly high when compared with air. Consequently, there is a good deal of bending of light as it passes from air to fiber and fiber to air. The alternate spacing of air and fiber in a sheet, together with the shape of the fiber, is sufficient to explain why wet pulp is darker than dry pulp, and why a waterleaf handsheet is far from being transparent.

The papermaker, so far as transparency is concerned, may desire to make the paper either more opaque or more translucent.

Any material which will fill the interstices of the paper and yet have a greatly differing refractive index from the fibers will increase opacity. Air, of course, is the cheapest material to use for this purpose as evidenced by either a waterleaf handsheet or piece of filter paper, but other materials must be considered if printing papers are desired. The use of high refractive index pigments, pigments that have been given increased attention during the past year or so, makes it possible to produce more opaque papers that are lighter in weight than formerly.

Transparency, on the other hand, may be obtained by crushing the papermaking fibers into close contact as in glassine, or by the addition of wax. Unfortunately, if too much crushing is done, strength is lost. On the other hand, since paper is doubly refracting, only its average refractive index can be matched by the wax. Then, too, the wax, when cooled, crystallizes and adds to the opacity. The ideal would be to utilize a wax which would not crystallize and which would have the same refractive index as that of paper.

Since opacity is such an important characteristic of paper, means have been developed for measuring it. The so-called contrast ratio method of determining opacity through the use of a photometer having a divided photometric field has been adopted as the official standard method of the Technical Association of the Pulp and Paper Industry, but either printing opacity or contrast ratio determinations may be made with greater accuracy and speed by means of the Davis photoelectric opacimeter.

Gloss as a function of reflection is closely related to the surface condition of paper. The only commercial

instrument now available to measure gloss of paper is the Ingersoll glarimeter. This instrument actually measures the relative amounts of specularly and diffusely reflected light for the polarizing angle of paper. It is well to remember that although this excellent instrument will function very accurately on ordinary papers, misleading results may be expected if the gloss of wax papers or certain coated stocks are measured with it. This is because the angle of polarization of specularly reflected light varies as the refractive index varies. It, therefore, may happen that a very glossy waxed paper will read low because the refractive index of the wax is lower than paper and because the specularly reflected light is not completely polarized.

It is also important and desirable to be able to measure the color of pulp inasmuch as this characteristic bears a direct relation to the amount of bleaching, and will, in the end, effect the color or brightness of the finished paper. At the present time, however, there is not known to the author any satisfactory method of doing it. It is common practice, of course, to issue standards from the control laboratory to the man at the bleaching pit, but it is known that such standards fade over a period of time.

It is, therefore, doubtful whether any mill at the present time can state definitely and surely that they are bleaching to the same degree of whiteness today that they did a year ago. There have been numerous attempts made to devise instruments or equipment for measuring this characteristic. These attempts have fallen into one of two classes, either the use of a spectrophotometric device (either visual or photo-electric), or a permanent disc standard device.

The first method mentioned, the spectrophotometric method, is not of great value in measuring such light colors as are produced in sulphite, soda or rag pulp. With kraft pulp, results would be somewhat different, since there is more residual color in the usual run of this product.

For those who have worked with the fixed standard disc, made from colored Plaster of Paris or some similar material, it will hardly be necessary to point out the impossibility of securing a perfect match, and also the difficulty of maintaining a standard once it has been obtained.

There remains one other type of color comparator, which to the author's knowledge has not been seriously tried out by the paper industry. This is the Nickerson color comparator, as developed by Miss Nickerson of the Department of Agriculture in measuring products, which, in a general way, have something of the physical characteristic of pulp. (The author had in mind particularly the use of this equipment for grading and measuring the color of cotton, which, being a natural fibre, ranges in color from almost a pure white to the natural brown of certain grades.) This equipment consists of an optical head or colorimeter head which enables the user or operator to see portions of two fields or two different things at the same time. This is accomplished by a unique arrangement of prisms and lenses, by which the operator views a circular field cut in half, each half representing a different object.

Munsell color standards or discs are used with this comparator as standards. These standards are all referred to a well-known and accepted system of color nomenclature, and the discs themselves are slotted on one side from the center to the periphery in such a way that they may be overlapped or built up to match any color. The periphery of the mounted disc, on which these standards are placed, is graduated so that when a sample of pulp has finally been matched exactly by looking in the eyepiece, the percentage of the different colors may be read off directly from the periphery. It thus becomes possible to define the color of pulp as a definite percentage of red, yellow, etc.

It is not to be expected that the use of this equipment can be immediately accomplished without some further consideration on the part of pulp and paper mill research workers. Pulp is wet at the time it should be measured for color. This wetness complicates the measurement, since wet pulp would be much darker than a batch of pulp without much water in it. It will, therefore, be necessary to work out some method of standardizing the amount of moisture in the pulp before it can be satisfactorily measured for whiteness. Where pulp can be examined dry, the comparator can be used without any difficulty.

The measurement of the color of paper is another difficult and interesting problem.

Paper men are almost unanimous in stating that it is their opinion that it is not necessary or desirable to measure the color of colored or tinted papers. These are matched by eye to satisfy visual requirements, and it seems hardly necessary to resort to instrumental methods to measure this characteristic. With printing, bond and bookpaper, however, in the so-called bright papers (near whites), it is much more desirable to be able to specify, or at least to record, the color of the product.

This may be done satisfactorily with the equipment previously mentioned. In fact, very slight differences in tint or brightness may be easily detected through its use.

The polarizing microscope has been used by only a few advanced workers in the paper industry. Similarly, the use of the dark field, is not extensive, although it has many advantages. The micro projector is, however, coming to be quite widely used in connection with beating operations. It allows for a rapid evaluation of the pulp by every one interested, and, when used in conjunction with a freeness test, provides complete information as to the condition of the pulp.

Photomicrographic equipment also has a distinct and useful place in any paper mill which is trying to improve its product. The laboratory can prepare at intervals photomicrographs of fibers, taken at different stages of the process, and these can be used by the superintendent in checking processes and products. At the same time, new or improved papers can usually be sold through the use of photomicrographs as convincing proof of the improvement.

Optical measurements of paper and papermaking materials, therefore, furnish important data for use in the control of process operations, in the development of specialties and new products, and in advertising and sales campaigns.

❖ ❖ ❖

◆ RESEARCH designed to produce new products and to create new demands by the public, is one of the most promising means of stabilizing employment.—*Karl T. Compton.*

Resourcefulness vs. Resources

Will Management Learn to Avoid Business Depressions?

By ARTHUR B. GREEN
Management Engineer

A FEW active business men, such as Louis E. Kirstein of Boston and Ralph W. Page of Raleigh, North Carolina, and a writer or two, such as James Truslow Adams, indicate that they charge the business depression partly to mismanagement of business. The thought, it is true, has not had loud seconding by the bulk of men loaded with management during the past business generation, but at least it is suggestive. Whether or not it is sound as a conclusion may be open to bebate, but anyone concerned with management can profitably examine it, for the meaning is that perhaps something does lie within the power of management to make future depressions less likely.

While the pinch is on, it is easy to be so preoccupied with trying to get out as to forget the blessings of new business. New business is business on new lines, dealing with new products. Whether the old lines of manufacture and trade, done in the old way, will suffice to end depressions is a question. It is easy to assume that they will. But economic history seems to say that they never have. In the past, there never has been a major economic surge without new products filling new wants, or new facilities for trade, or great new territories in which to trade.

Under the stress of the day, it is also easy to pass over one other factor. The passing of the depression favors new lines of effort. While business has been low, people have been multiplying. There are more of them. The added ones are young. And young people bring with them new tastes and whims, new wants, and especially a fresh willingness to try the untried. Industry must move to meet these *new demands*—not the old ones.

If that is a difficult program for management, it has special difficulties in the management of papermaking and paper distribution. Everyone thinks of paper as a staple. That thought carries with it a fixed character for paper and a certain limited number of uses for paper. And there is the papermaking plant. Before one such plant can start up, there is an enormous investment of money, for the machinery is big and complex. Once bought and set in motion, the problem of management is to keep it going and pay off the obligations. Very remote is the thought of changing it. And in the face of the usual forms of financing, it would be awkward in the extreme to be forced to change the plant.

This inflexibility of the paper business, mental and physical, is heightened and not helped by the accountant and the banker. They attempt to measure a business exclusively by money. A high ratio of current assets to current liabilities, prompt regular returns on outstanding obligations, large earnings for shareholders, mounting cash reserves, ability to hire expensive executives, establish the credit of any business so far as the accountant or the banker goes. But these factors with which they are trained to reckon are the results, not the causes, of business success. They are statistics which reflect the past. What must be known, on the other hand, to determine any program for the future, is the likelihood of success in time to come, under conditions that never existed before. The customary view of business, the accepted appraisals of value, are all hindsight; whereas future earnings depend on foresight. Money is not the important factor.

Money has always been unstable and misleading. A business with a normally high ratio of quick assets, even a large reserve of cash, faces a slump. But what is a slump? The first symptom of a slump is indicated by prices falling faster than costs. That makes the first inroads on the reserve if not on the assets. The second symptom, contraction of the market, defeats the best that money can do, for no business can obtain money without opportunity to sell. When buying halts, money and assets become drugs on the market and vanish.

Or, in the opposite case, a business with a high ratio of quick assets meets with a boom. The first symptom of a boom—prices rising faster than costs—pours money into the reserve, or into profits, but debases the money already there and adds to it new money of lower buying power. The second symptom of a boom —expansion of the market—tempts every business to turn low-power money into high-cost extensions of plant in the hope of capturing a larger share of the sales field, but adding machinery of the old kinds to make more of the old products. To this temptation most companies yield. Then arises the cry of *overproduction*, naming something that never can exist to express what really is *misguided production*. But even those companies which do not join the rush have the choice merely of turning their money into milk for the owners or hoarding it, and in both forms it vanishes in the next slump.

Serious as a corollary to this money view of business is its effect on selling method. With an eye to money, because it meets the banker's standard, a board of directors will instinctively look to sales as the source of money. Every proposal from the sales force promises more income in money. But the board also sits to hear proposals from the mill, and these all fall on the side of outlay. Without analyzing it, the members of the board come to regard selling above making, welcome the salesman as an asset and look on the production man as a nuisance. Hence, in a pinch, money flows into renewed selling pressure instead of going

into better things to sell, and the slump thus grows into that much more of a slump.

"Many persons think," wrote Mr. Ford at the height of the boom, "that by hoarding money they are gaining safety for themselves. If money is your only hope for independence, you will never have it. The only real security that a man can have in this world is a reserve of knowledge, experience, and ability."

There points a direction in which management can turn. What is true of an individual is just as true of a group of individuals such as an industrial company. "Every factory," said Frederick W. Taylor, long ago, "is first of all a man factory." Taylor meant two things: One, that the prime object of management is to train, inspire, and lead men; the other, that the prime asset of any company is its reserve of knowledge, experience, loyalty, and ability.

More important for the future of any company than the statement of operations or the balance sheet is the versatility of the men who compose it and the grasp they possess on the fundamentals of their art. If these factors are what they should be, the money will take care of itself. Where these factors are strong, we find today here and there a few paper companies that have stayed out of the red consistently, some of which have made more money since 1929 than before. For in the ability and training of the men lies the cause of business success, of which money showings are one result, and by money showings may success be gauged, not beforehand, but only afterward.

The company which warrants financial credit today is the company with this assurance for the future: That it possesses a high reserve of knowledge, experience, loyalty, and ability, and shows these traits actively at work. Bankers and accountants have to change their form of appraisal. For even in so fixed and inflexible a business as paper, there are signs of such a working reserve, and they may be viewed from the outside.

For instance, other things being equal, investment in a paper mill is safer if you should ask the head of the business whether he can come in on a Monday and start up his machines unassisted, and he tells you he can because he has done it many times before. Such a man can lead machine tenders.

Or again, ask the head of the business what paper is going to be made of twenty years from now. If he says *wood,* don't invest. If he says he doesn't know, but has a bright lad working every day in some corner of the mill on that very question, so far as it relates to his classes of papers, and further tells you that he can hardly leave that lad alone, then he is your man. If you would double-check, see the lad and find out how many of the lines he is following were suggested to him by his superior.

A third check: Ask the head of the business on whom he relies for the quality and uniformity of his papers. If he says he depends upon himself, smile. If he says he relies upon his inspectors, have another smile, for that is too late. If he says he has expert papermakers and trusts them, give him credit for trusting. But if he tells you that he has a regular daily program in effect, digging into the steps of the processes, finding measurements wherever somebody has to guess or estimate, developing the one best way of doing each job, then he is a man of the future. To double-check again, notice the differences between the methods of work he uses today and the methods in use ten years ago, or two years ago, or the methods his competitors still use.

Fourth: See the men at work in the mill. If they are laboring hard, or shirking labor, don't invest. If they take their work at a comfortable stride, using their heads first and their hands and feet afterward, they are under leadership, and like it, and are apt to remain loyal. If their tools are there when they want them, and in good condition to use, if materials are neatly handled and floors clear and clean, there is method in the work. You may know nothing about papermaking, but you have seen outward signs that they *do* know in the mill and work intelligently at it. You conclude wisely that whatever the balance sheet may show today, the earning power of that mill is going up, not declining.

Given a business that passes such an appraisal, and you are assured that if faced with an emergency it will find ways out or around and take them. Resourcefulness is the word. If we permit ourselves a little play on words, *resourcefulness* is better than *resources,* as reason for financial credit. We need a form of appraisal that shows the reserve of knowledge, experience, loyalty, and ability, for with these traits actively at work management has a lot it can give to make depressions less likely in the years to come.

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Does Steam Trap Insulation Pay?

By An Engineer

THERE has been much discussion as to whether steam trap insulation pays—that is, whether the cost of covering and the inconvenience of covered traps does not offset the benefits derived from covering them. In all cases this problem is susceptible to a mathematical analysis which should indicate whether trap insulation is economical.

The following analysis was made in one mill of a group of 1¼-in. traps operating at 50 pounds pressure. The external surface of each trap was found to be 1.8 sq. ft., the temperature of saturated steam 298 deg. Fahr., and the temperature of the external air 70 deg. Fahr. Assuming that 1 sq. ft. of trap surface radiated 3 BTU per hour per degree Fahr. temperature difference, then the radiation loss per hour becomes 3 BTU x 1.8 sq. ft. x (298 deg. — 70 deg.) or 1231.2 BTU. With the plant operating 24 hours per day, 300 days or 7200 hours per year, the BTU loss per operating year becomes 7200 x 1231.2 or 8,864,000 BTU. With 1 pound of steam equal to 911 BTU, the steam loss per year would equal 8,864,000 ÷ 911 or 9,730 pounds. With steam costing $.35 per 1000 pounds, the monetary loss of steam with the insulated traps would equal 9,730 x $.35 ÷ 1,000 or $3.41. The cost of covering the traps was $.90 each. The amount of heat saved by insulating the traps was 85 per cent of the total or 85 per cent of $3.41 or $2.90. Therefore, a saving of $2.90 — $.90 or $2.00 can be made the first year. Such a figure indicates that the coverings of these traps will pay for themselves in less than six months.

ONE YEAR OF PROGRESS

in Development of Paper Mill Equipment

MANY new items of equipment to aid the manufacturers of pulp and paper in reducing production costs and in increasing plant efficiencies have been placed on the market during the past few years. A considerable number of these new items have been formally announced during the past twelve months or so.

Processing Equipment

Among the more recent process equipment developments for pulp mills that might be included in such a list are the *F. M. P. heater* for pulp digesters and *the F. M. P. coarse screen and knotter* of Fibre Making Processes, Inc., Chicago, together with the Centrif-diaphragm screen and the Tell-tale screen of Trimbey Machine Works, Glens Falls, N. Y.

The F. M. P. heater, now in service on both sulphite and sulphate digesters, utilizes a single-pass design which simplifies piping layout and reduces friction loss. Both ends of the heater are provided with swing covers which permit quick inspection of the inside and also allow for tube servicing without removal of the tube bundle. Leaks between the steam chamber and the liquor chamber, due to faulty packing, are eliminated through the use of an outside expansion joint.

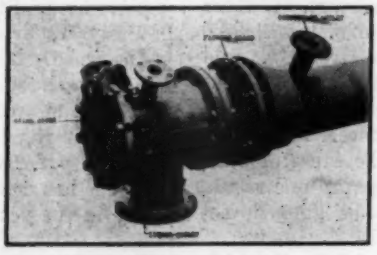
The F. M. P. coarse screen and knotter, as its name would indicate, has been designed to remove at the beginning of the screening cycle as much of the impurities in the stock being screened as possible, to relieve the fine screens from doing this work, and to reduce the wear of the screen plates. A helix within the screen retains the screenings for six revolutions and a low pressure white water shower washes the good fibers free from them. Power is applied to the screen through a vertical splashproof motor and gear reducer arrangement. The motor is mounted directly on the screen and connected with the gear reducer in the manner illustrated.

Advantages claimed for this design of screen are high capacity with small perforations, and small power consumption.

The *Centrif-diaphragm screen* of *Trimbey Machine Works* is said to combine in its design the good features of both the centrifugal and flat screen. In fact, it embraces in its design the well-known centrifugal screen with its rotor and perforated plates and a quality gum rubber diaphragm which occupies a portion of the space usually taken by the cover of the centrifugal unit. The diaphragm is operated through roller bearing mounted eccentrics driven through a silent chain off the rotor shaft.

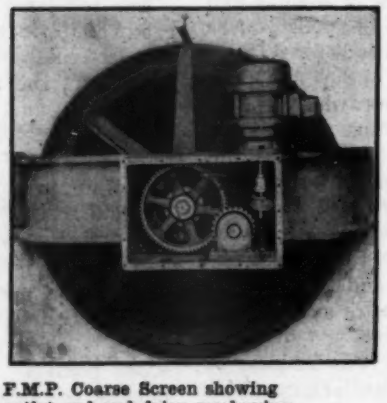
It is claimed in the operation of this screen that impulses set up in the stock confined within and without the plates by the oscillations of the diaphragm loosens the fibers from the holes in the screen plates and that the rotor of the screen must only keep the stock within the plates revolving. It is suggested by the manufacturer that the clogging fibers, as they are loosened from the holes in the screen plates, are washed away by this revolving stock. The screen plate openings are then free to permit the passage through them of fibers of suitable size until closed again.

In operation, the screened stock level is maintained at about the same elevation as the diaphragm, and the unscreened stock only a little higher. The rejections are removed in the same manner as in the centrifugal screen,



End view of F.M.P. Sulphite Heater

and are carried about three feet above the top of the screen. They are said to be well cleaned with their volume being governed by the height of their discharge outlet. It is further claimed that since power is not used to drive the stock through the screen plate openings there is not the resultant breaking up of particles of dirt and bark. Hence, cleaner screening may be



F.M.P. Coarse Screen showing outlet end and drive mechanism

had through the same size perforations than with the straight centrifugal. In addition, since the rotor is used simply to keep the stock in rotation, the screen does not need to be driven as fast as in the straight centrifugal and power requirements are thus reduced.

The production of this screen has been placed by the manufacturers at from three to four tons of screened stock per horsepower consumption.

Another interesting development of the *Trimbey Machine Works* is a *small diaphragm screen* for use in detecting leaks or broken plates in screening systems. It utilizes a single 12 in. by 43 in. plate which is provided with a diaphragm and a steel eccentric that is fitted inside a Micarta block. The diaphragm is located at the side, and is driven through the eccentric by means of a chain drive from a fractional horsepower single phase motor.

Its use permits a small sample to be drawn continuously from the screened stock line and passed over the plate. The presence of slivers or shives in the stock is made evident by their accumulation on the plate which, by the way, is placed at a slight angle. Steps can then be taken to correct any trouble of this kind before the entire system is contaminated.

A somewhat *similar design* of *screen* has also been developed by the same manufacturers for use in the laboratory. The over-all dimensions of this unit, exclusive of the eccentric and drive, are 14 in. by 18 in. by 9½ in. high. It uses a 10-in. by 12-in. screen plate.

There also has been progress in the development of beating and refining equipment. Some of this work is not yet far enough along to permit any mention of it at this time, but it may be said to be along lines that look very attractive.

One development that might properly fall into this phase of production equipment and which can be mentioned is the *Trimbey-Witham, Jr. density and freeness regulator and recorder.* This device, manufactured by Trimbey Machine Works, Glens Falls, N. Y., has been conceived not only for the purpose of continuously determining freeness of stock, but also to indicate and record this characteristic of the stock as it leaves the jordan, to automatically control its consistency or density before entering the jordan, and to record such variations as occur in its consistency as it leaves the beater chest.

In making an installation of this machine it is installed so that the jordan discharge enters the vat of the machine. A portion of this stock then passes through a Trimbey automatic consistency regulator and thus controls the admission of necessary thinning water at the jordan inlet. A second portion of stock passes beneath a slowly revolving wheel that is designated as a freeness wheel. This wheel is in reality a narrow bronze cylinder with six equally spaced perforated plates on its circumference. Each of these perforated areas connects with a bucket type arrangement for elevating water to the hollow shaft of the wheel.

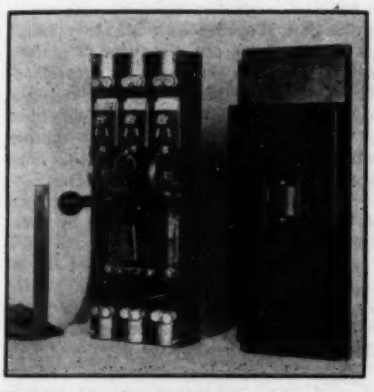
The volume of water removed by the cylinder, when it is rotated at a con-

stant speed and immersed to a constant depth in stock of a fixed and uniform density, therefore, becomes a measure of freeness. This water is led to a standpipe equipped with a constant bleeder orifice of suitable area and the resultant head in the standpipe recorded by means of a low level liquid recorder.

The Teale flexible slice is a new paper machine specialty that is being manufactured by *E. D. Jones & Sons Co.*, Pittsfield, Mass. This device consists of a flexible blade which is placed at an angle to the wire of a fourdrinier machine and is supported by the deckle frames. The whole device is adjustable vertically, and the flexible blade has a series of adjusting screws arranged so that the blade may be distorted either toward or away from the wire at various points across the machine.

The slice is made in three types: namely, fixed deckle, adjustable deckle, and limited adjustable deckle. It may be used as a first or second slice to take the place of the old type slice.

The production of a level sheet is cited as the primary object of the slice,

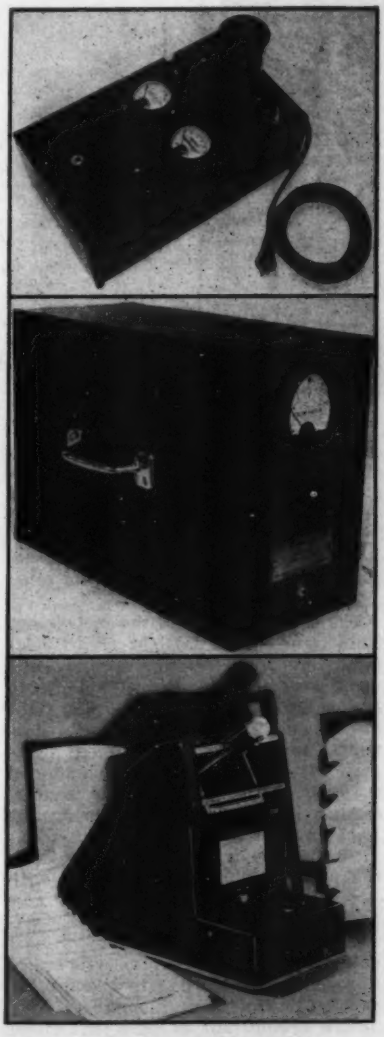


Westinghouse De-ion Circuit Breaker

although several other advantages are mentioned.

Another new development for paper machines is an *electronic speed regulator* for single motor paper machine drives. It is a product of the *Westinghouse Electric & Manufacturing Co.*, East Pittsburgh, Pa., and is said to function without time delay, friction, or moving mechanical parts; and, therefore, does not require mechanical adjustments to assure its proper functioning. It is also said that the use of this type of speed regulator assures consistent results as well as a very high degree of sensitivity and accuracy.

Some years ago, the *Westinghouse Co.* developed a *system of electrical regenerative braking* with automatic tension control for unwinding stands. This system includes a direct current generator which is driven from the shaft of the unwinder. The output of this generator is automatically controlled by means of a special regulator which serves to maintain constant current output of the generator by adjusting the excitation of the generator to compensate for the changes in its operating speed from a full to an empty core. In those cases where the winder or similar apparatus receives its energy from a direct current source, the braking generator can be arranged to feed back into this source. Where the equipment is driven by other means the braking generator can be arranged to feed back through a series wound d-c. motor connected to the main drive. The tension is constantly maintained without the necessity of repeated manual adjustments as with the mechanical brake. The mechanical brake which ordinarily requires frequent attention and maintenance is eliminated and the braking effort instead of being dissipated in brake lining wear is converted into useful energy and returned to the drive.



Upper—Westinghouse Transometer measures the percentage transparency of paper. Center—Westinghouse photoelectric color matcher. Lower—Davis opacimeter

Improvements this year have greatly increased the usefulness of this type of braking. The design of the control equipment has been modified so that tension may be applied to the sheet while the equipment is at a standstill. The control has been arranged so that the operators may remove tension permitting them to readily unwind sufficient paper from the roll for threading after which tension may again be applied preparatory to placing the equipment in operation. This braking generator and tension control equipment has been so designed that it may be added to existing drives or made a part of the original layout.

An improved *combining and lacquering machine* is one of the recent developments of *The Cameron Machine Co.*, Brooklyn, N. Y. The machine takes the original material from the roll and rewinds it into rolls. Novel effects may be secured by combining such dissimilar materials as paper and foil, cloth and paper, and paper and transparent films.

This machine provides for covering of the web with any desired thickness of film. Micrometer adjustment on the upper coating roll, stated to be accurate to .0002, assures a uniform film across the entire web. The same adjustment provides a means of canting the roll to compensate for variation in the web. The coating rolls may be arranged for heating with steam, oil, or hot water as desired.

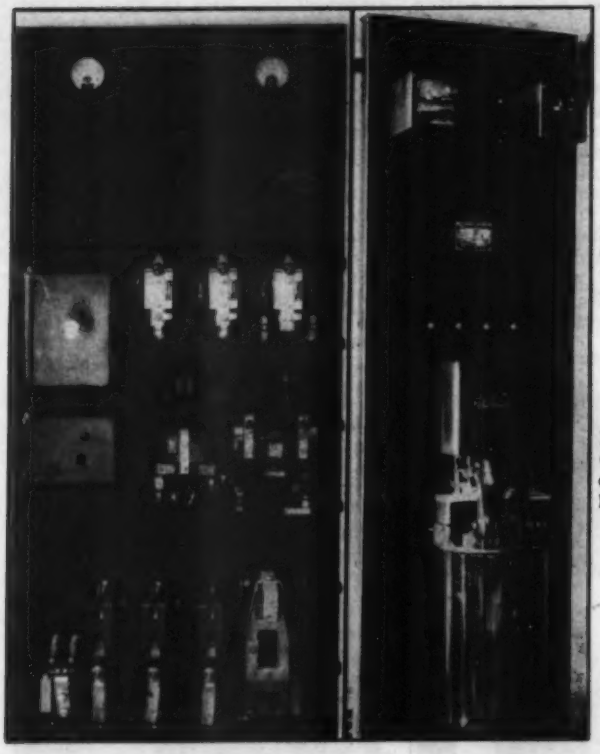
A Westinghouse motor protected against overheating. Note thermoguard

It should be stated that this machine also may be used for lacquering or applying varnish coatings.

The machine is built in standard widths of 22, 32, 42, 52, 62 and 72 inches, and requires from 5 to 15 hp. to operate depending on width of web, kind of material, and the nature of the operation being performed.

During the past year the *Moore and White Co.*, Philadelphia, has developed a *sheet paster* for combining board of any ply and thickness. This machine is ball-bearing equipped throughout. It is said to be very economical in power consumption and in the amount of silicate used at greatly increased operating speed and reduced operating cost.

Several instruments have also been placed on the market to aid in more accurate control of process operations. Among them that might be mentioned



Left—
G-E Magnetic full voltage synchronous motor controller

Right—
G-E Automatic Reclosing Feeder Panel

are the *Bausch & Lomb opacimeter*, the Westinghouse Trans-O-Meter, and the Westinghouse color matcher.

The opacimeter has been developed by Bausch & Lomb with the advisory assistance of the Institute of Paper Chemistry after the design of Dr. M. N. Davis of the Kimberly-Clark research laboratories. The instrument, measuring only 8¼ in. by 19½ in., is built around a photoelectric cell and an illuminating system, and reads either printing opacity (as defined by Davis), or contrast ratio (as defined by T. A. P. P. I. official methods) direct without computation. At the same time, it is stated that the results obtained on one instrument will check exactly with those of another, and that the instrument never requires calibration.

The *Westinghouse Trans-O-Meter* has been designed to measure the transparency of a sheet in terms of the human eye sensitivity and the percentage of transparency is shown on a direct reading instrument. Paper samples do not have to be cut to any given size. A long strip, for example, taken over the full width of a paper machine can be drawn slowly through the instrument and observations made of any variation in transparency.

The Trans-O-Meter is built in a light steel case which has a convenient handle for carrying it. This case contains the complete device ready to be connected to a 110 or 115 volt direct current or alternating current supply. The device is provided with a voltage regulator to insure constant output from the lamp.

The *photoelectric color matcher*, developed by *Westinghouse*, is arranged to compare samples at three points of the visible spectrum by the use of suitable filters, and indicates the degree to which two samples are matched. It is claimed that slight color differences, hardly discernible to the human eye, can be detected with little difficulty by the color matcher.

The optical system of the instrument is independent of daylight or artificial light. A standard concentrated filament lamp is run at low voltage to ensure long life. A three color light filter including blue, green, and red is mounted so that any one of these filters may be placed between the lamp and the concentrating lens. The concentrating lens and a mirror bring the light rays to the sample and a white integrating tube reflects these rays to the photo-tube, which is selected with a special color characteristic to give best operation with the lamp source. The matcher is arranged so that it may be placed over the samples or operated in the reverse position by placing the samples on the top of the matcher. The design of the unit is such that either light or dark samples may be tested with a high degree of sensitivity. The condition of the surface does not affect the accuracy of the matcher.

The electrical circuit of the instrument comprises a low grid current amplifier tube, photo-tube, coupling circuit, and sensitivity control. A sensitive meter is provided for comparing the output of the electric circuit obtained with the various samples being matched.

The instrument is light and portable and suitable for operation entirely from 115 volt, 60 cycle source.

Power Generation and Transmission

Of the electrical equipment manufacturers, Westinghouse and General Electric seem to have been particularly active during the past year in bringing out new developments.

A recent development in motor design by *Westinghouse* is the *thermoguard self-protecting motor*. This new design incorporates a device built into the motor which accurately detects the operating temperature of the motor and serves to protect it against excessive heating. In the application of motors to the paper industry there are many cases where the protection afforded by standard types of industrial control is not adequate to meet the operating conditions. In such cases overheating of the motor results and its life is materially shortened. This may occur either as immediate burnout or a gradual deterioration of the insulation. By supplementing the standard overload relay protection with a thermostat built into the motor, according to claims of the manufacturer, complete motor protection is assured.

In line with the thoughts of motor protection, *Westinghouse* also has placed on the market a complete line of *motors* with *splash and drip-proof* protection. The design provides for suitable covers and baffles which prevent the entrance of water to the interior of the motors when either the machines or the floor are being washed with a hose stream.

Splashproof motors have also been developed within the past year by several other motor manufacturers.

Other recent developments of *Westinghouse* would include the *synchro-tie* system, a new line of synchronous motor controllers, and the introduction of the de-ion circuit breaker.

With the synchro-tie system the rotors of two alternating current motors are electrically interlocked. The rotation of one of the units results in synchronous rotation of the second unit. With this system the rotors of these two units are said to be as effectively locked together as if they were connected by a common shaft, although they may be located at any distance from each other and in any suitable position. The torque is transmitted electrically between the units through the interconnection of their primary and secondary windings. When it is necessary to adjust the relative speeds of the two units of such a transmission, it may be accomplished by the introduction of a frequency changing unit, either in the primary or secondary circuit. Operation of the frequency changer permits operating one of the units of the synchro-tie at a higher or lower speed than the second unit. This function serves to eliminate the necessity of differential gears or mechanical speed changers. The torque capacity of such a system is only limited to the present limits of commercial motor design. This type of equipment is being applied to sectional paper machine drives to permit the proper adjustment of draws from the front side of the

paper machine, and may also be used for such applications as the remote operation of valve mechanisms, the remote indication of floats and similar devices, the tying together of conveyor systems, etc.

The new *Westinghouse* line of *synchronous motor controllers*, brought about in order to assume proper control sequence on starting as well as full motor protection during starting and operation without the necessity of close personal supervision, includes both semi-magnetic and full magnetic types, arranged for either full or reduced voltage starting, and supplied for either high or low voltage circuits. The Deion air circuit breaker, using the principle of the cold cathode arc and multiple gap extinguishing structure, is claimed to greatly reduce maintenance and to add to the safety of operation of breakers through the complete elimination of oil.

Among the developments of the *General Electric* Company may be mentioned a new line of *controllers for synchronous motors*, a *reclosing device for oil circuit breakers*, and a new *sound-isolating base for motors*.

Included in the new line of synchronous motor controllers, controllers which supersede all of the former standard lines, are relays for automatically applying and removing field excitation and for protecting the stator and amortisseur windings under various conditions of operation. A new Telechron motor-operated timing relay is used to initiate the transfer from "starting" to "running" connections on reduced voltage and "part-winding" controllers.

The reclosing device for use with oil circuit breakers is direct-acting, and will reclose a breaker when tripped by overload, one, two, or three consecutive times, with equal time intervals between reclosures. If the overload disappears after any reclosure, the attachment will return to its normal position and the breaker will remain closed. If the overload still exists after the last reclosure, the breaker will remain locked open and it will be necessary to close it manually before any further automatic operation takes place.

The attachment, which is directly connected to the breaker mechanism, is a mercury-tube device in which timing is obtained by running mercury through an orifice into a reclosing contact chamber. The number of consecutive reclosures that the equipment will make and the time interval between reclosures is fixed during the process of manufacture. A new tube, however, can be substituted if a different number of reclosures or some other time interval is desired.

In using the new sound-isolating base for motors, the motor is mounted as on a standard sliding base; belt tension and motor alignment are maintained in the ordinary manner; but floating members are suspended on specially developed isolating material. The stiffness of the sound-isolating material is said to be sufficient to maintain motor alignment for any reasonable belt tension. It is also stated to be equally effective at any motor speed between 100 per cent and 66 per cent of normal, and, in some cases, down to 50 per cent of normal speed.

The base is designed for use with each particular motor for which it is recommended, and is now available for use with polyphase induction motors of 1 to 50 hp., 900 r. p. m.; ¾ to 30 hp., 1,200 r. p. m.; and 1 to 3 hp., 1,800 r. p. m.; as well as with some small single-phase motors.

Another item of equipment developed by the *General Electric* Company is for use in steam generating plants. It is *equipment for indicating and recording the degree of density of smoke* passing through the stacks or breechings of boilers. The essential elements of the apparatus include a light source and a photoelectric relay unit. The recording instrument is optional.

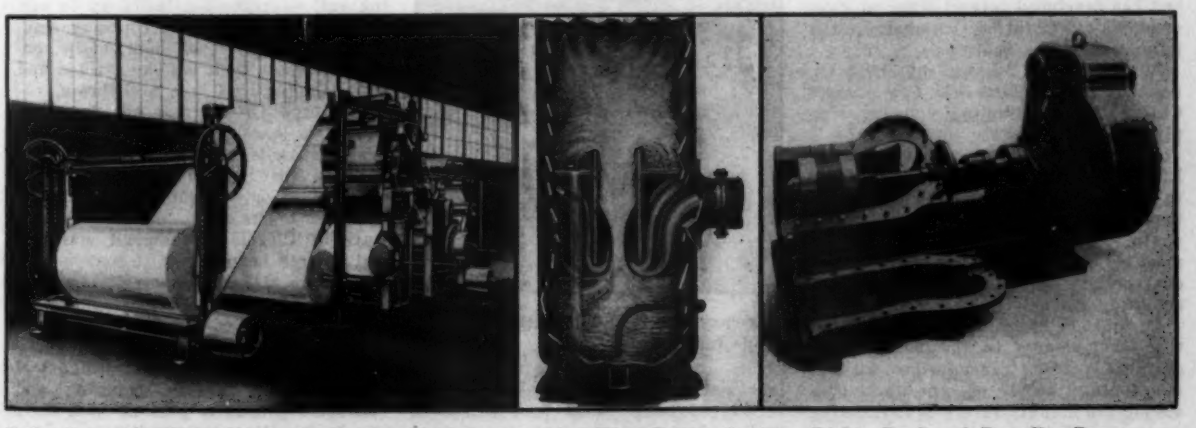
The photoelectric unit and the light source are designed for mounting on opposite sides of the stack so that the light beam from the light source passes through the stack and falls on the phototube. When there is no smoke in the stack the full intensity of the light is directed on the phototube and the indicating or recording instrument will register zero smoke density. As the smoke density increases, the phototube receives less light from the source and the instrument indicates or records the increase of smoke.

A few other developments for use in steam generation or transmission that might be mentioned are a line of new automatic stokers by the Link-Belt Company, Chicago, a line of desuperheaters by Blaw-Knox Company, Pittsburgh, Pa., and a new air-operated control system for pressure, temperature, flow, level, speed, position, combustion, etc, by the Bailey Meter Company, Cleveland, Ohio.

The *automatic stoker* of the *Link-Belt Company* is of the automatic underfeed type and is made in sizes for boiler capacities from 10 to 250 B. hp. Among the salient features of this design that have been pointed out by the manufacturers, are automatic electric controls for operating at pre-determined boiler pressures; finished castings of heavy grey iron; a chrome steel screw feed conveyor; variable speed drive for regulating coal feed with safety shearing pin for overload protection; and a unique design of motor mounting that permits direct connection to the forced draft fan.

The *Blaw-Knox desuperheater* is a self-contained machine based on the operating principle of the Blaw-Knox contactor which was developed for use in other fields for intimately mixing gases and liquids. The accompanying cutaway view shows clearly the principle involved. Superheated steam enters the lower chamber, depresses the water level (feed water at steam temperature) and in passing upward through the contactor tube carries this water with it, mixing the steam in a swirling vortex or waterspout, thus bringing the steam and water into intimate contact and desuperheating the steam. The water level, controlled by a feed water regulator, is maintained so that the amount of water carried upward through the contactor tube is many times that required. The majority of the excess water drains back to the lower chamber through water sealed run-back tubes, but any moisture which may be carried onward with the steam is removed with a steam purifier (Tracyfier).

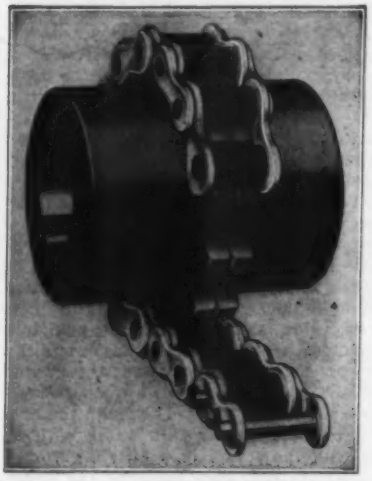
The new *air-operated control system* of *Bailey Meter* has incorporated in its



Left—Camachine Three-Ply Laminating Machine. Center—Blaw-Knox De-superheater. Right—De Laval Propeller Pump

design the use of a free floating air pilot valve. Only .004 of an inch travel of the pilot valve stem is required to obtain complete control drive travel. Likewise, the construction of the valve is such as to permit the pilot valve stem to slide on past the neutral point should the indicating or recording device move in that manner.

This air pilot valve operates power cylinders or diaphragm operated valves depending on the factor to be controlled. It has been applied to the regulation of temperature and pressure in pulp mill digesters, the temperature of pulp grinders, and to the control of combustion in steam power plants. The combustion control is designed, not only to maintain steam pressure, but also to proportion fuel and air so as to maintain highest combustion efficiency consistent with economical operation.



Link-Belt "RC" Flexible Coupling

In the field of mechanical power transmission there have also been developments. *Westinghouse* has extended their line of *gearmotors*. *Norma-Hoffmann* Bearing Corporation, Stamford, Conn., has added additional sizes of *GreaSeal felt protected ball bearings* to their already extensive line of enclosed bearing; has introduced the *C D Duplex* angular contact series of ball bearings; and has developed several different lines of *pillow blocks* for particular use in the pulp and paper field.

A new *flexible coupling* has been announced by the *Link-Belt Company* of Chicago. The coupling consists simply of two cut-tooth sprocket wheels (or coupling halves) and a piece of Link-Belt "RC" Silverlink roller chain to connect them. A pin and cotter link makes it easy to couple or remove the chain. Where desired, this coupling may be used with either a stationary or revolving automatic lubricating oil retaining casing.

It would be amiss to mention some of the developments in the field of mechanical power transmission without mentioning some of the activities among the manufacturers of lubricating systems and lubricants.

The Alemite Corporation, Chicago, has perfected and introduced to the market a new system of lubrication to be known as the *Alemite hydraulic system*. This system combines the locking security of the original Alemite bayonet type system with the quick attachable and detachable features of the Alemite push type system. A coupling of new design is employed in combination with a new style fitting to effect what is claimed to be the most perfect seal which it has ever been possible to effect between a grease gun and fitting. The new coupling design is said to completely eliminate leakage at the point where the compressor engages the fittings and further utilizes all of the pressure exerted by the operator.

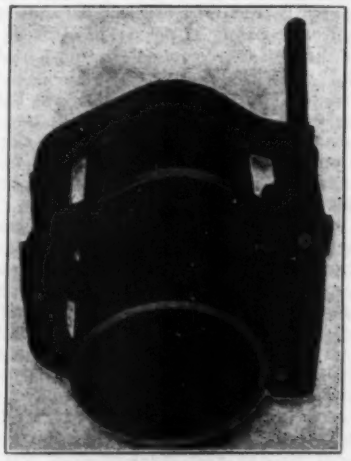
It is recommended by the manufacturers for use on grinders in groundwood mills, chip conveyors, log conveyors, rollers for conveying rolls of paper, cranes, trucks, and for the wet end of paper machines. In addition it is also suggested for the lubrication of stokers, conveyors, fans, blowers, and pumps in the power house, and for line shafts, countershafts, and clutches.

E. F. Houghton & Company, Philadelphia, has announced a new line of industrial lubricants, known as *Sta-Put lubricants*, that are made in three series, namely 300, 400, and 500 from polmerized pure mineral oil. The 300 series are liquid and range in consistency from light machine oils for high speed spindles to heavy oils for slow moving bearings and extremely high loads. The 400 series are made especially for gear lubrication. Several grades have been developed for all types of gears to meet any condition of speed and load. The 500 series are of grease consistency and are made for screw-down grease cups, automatic grease lubrication systems, etc. It is claimed they will feed freely through any system, and that they will not separate, harden or turn rancid under any condition.

Another new lubricant uses metallic lead as the protective element. The minimum constituency of lead in this lubricant is 10 per cent and ranges up to 65 per cent. This lead has been broken down into such finely divided parts that it is said to be virtually a soluble or liquid lead within a lubricant vehicle. It is claimed that this lubricant will withstand temperatures up to 430 deg. and will not entirely lose its lubricating stability until the melting point of lead is reached (590 deg).

Cleveland Tramrail Type CHS Crane Installation

This new product, known as *Bestolife*, forms a thin protective film of lead on all contacting surfaces which changes such surfaces to a continuous unbroken, anti-frictional area according to the manufacturers, *Armite Laboratories*, 1450 East 61st Street, Los Angeles, Calif. The principal applications for this product in the paper industry, as suggested by the manufacturers, would be for use as a lubricant for gears, bearings, chains, pump and valve stem packings, plug cocks, pipe threads, and guides.



Bull Dog Pipe Welding Clamp

Materials Handling

Four new items of materials handling equipment have been developed during the past year by *Cleveland Tramrail Division* of The Cleveland Crane and Engineering Company, Wickliffe, Ohio. These items are the *eight-inch arch beam*, *type CHS cranes*, *type D switch*, and *type WTH motor driven carrier*.

The eight-inch arch beam was designed to fill the need for self-supporting rail supports for loads up to and including two tons under proper loading conditions. It is identical in construction with their well-known ten and eleven and a half inch arch beam.

The type CHS crane has been designed for loads up to one ton where the bridge span is not over 16 feet. It is suitable for hand propelled carriers, either with or without chain or motor operated hoists, and operates on runways of Cleveland Tramrail standard rail or arch beam.

The type "D" switch was designed for use with all types of Cleveland Tramrail hand-propelled carriers and for certain types of electrically operated carriers. It is of more compact design and permits closer switch grouping and rail spacing than is possible with their standard sliding type switch.

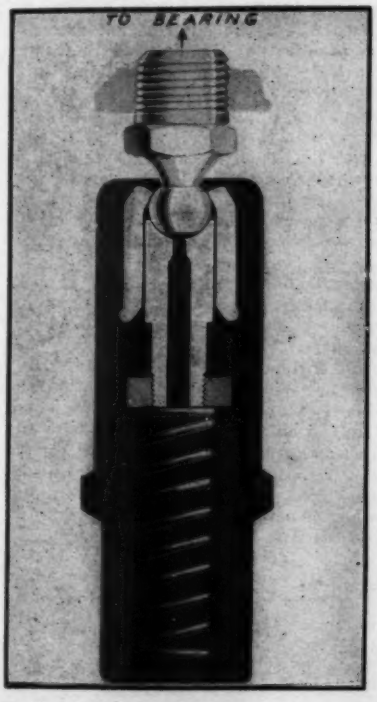
The tpye WTH motor driven carrier was developed for operation on Cleveland Tramrail systems at speeds ranging from a "creep" to a speed not in excess of that at which the operator can walk. This carrier can be had with an electric hoist of either 500, 1,000 or 2,000 pounds capacity.

An improved design of *portable belt conveyor*, a new design of *elevator bucket* for heavy duty work, and an improved *finished-steel roller chain* have been brought out by the *Link-Belt Company* during the past twelve months.

The portable belt conveyor, built as a unit on 21 ft. centers, employs a rubber belt of 18 in. or 24 in. in width, which operates over all-metal troughing type idlers equipped with antifriction roller bearings. Fixed steel retaining sides extend the entire length of the conveyor. The design also permits the use of the machine with or without the foot end plate.

The principal features of the new design of elevator bucket are heavy back, heavy lip, reinforced corners, front reinforcing ribs, reinforcing bead around ends, and middle of lip raised to reduce digging strains. It is also made of Promal, which is said to be a new, stronger, longer-wearing metal.

The improved finished-steel roller chain has been given the trade name, Link-Belt Silverlink. It is made in all sizes from ⅜ in. to 2½ in. pitch,



Sectional view of coupling and fitting in Alemite hydraulic system

and in single or multiple widths. The sidebars are made of alloy rolled steel that has been heat treated for strength and toughness. The pins are of case-hardened nickel steel, the bushings of case-hardened solid steel, and the rollers of heat treated alloy steel having a strong fibrous structure and with the fibres running around instead of across the rollers.

For the liquid handling of materials, the *Morris Machine Works*, Baldwinsville, N. Y., has developed its line of *side suction pumps*. These pumps are adapted to white water service and many other general pumping services in pulp and paper mills.

The *Duriron Company, Inc.*, Dayton, Ohio, has announced a new *centrifugal pump* for handling corrosive chemicals. This pump has a one-inch suction and a one-inch discharge. At 1,750 r. p. m., the head and capacity range from 2½ g. p. m. at a 25-ft. head to 25 g. p. m. at a 5-ft. head. The power consumption varies from approximately ¼ hp. to less than ½ hp. when used to handle water. The pump is procurable in Duriron, Durichlor, Durimet, Durco alloy steels, Alcumite and in the chemical lead alloys.

Another pump that has been introduced during the past year is the *propeller pump* of the *De Laval Steam Turbine Company*. This pump was designed for the handling of relatively large volumes of liquids against comparatively low heads. The liquids flow through the pump in smooth lines without abrupt turns or change of direction, and leave without turbulence or shock.

The pump casing consists of two parts, which are separated in the plane of the center line of the shaft by a flat joint, that is maintained air and water tight by a thin paper gasket. The propeller is designed for the specified conditions of capacity, head and speed, and is finished on all surfaces. The casing around the propeller is protected by a separate sleeve, which can be renewed should wear occur. This sleeve supports the guide vanes by which the liquid being pumped is directed in smooth flow-lines. The shaft is protected from wear by a removable protecting sleeve which extends through the stuffing box and provides a bearing surface for the packing.

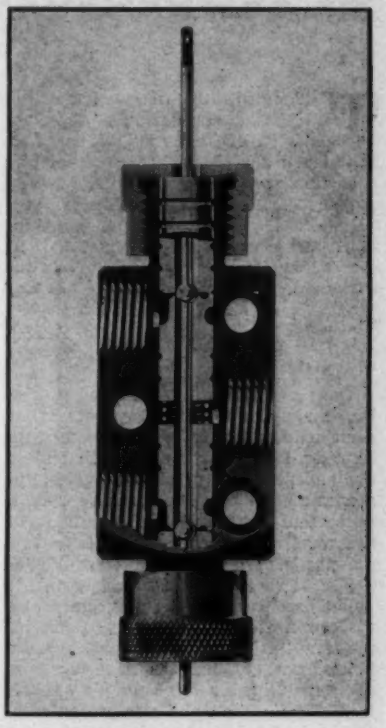
This pump is built for both horizontal and vertical installation and is available for all capacities and for heads up to about 40 ft.

Several new designs of valves have been brought out by *Jenkins Bros.*, New York City. These valves are designated as *Figs. 762, 950, and 956 bronze regrinding valves*. Fig. 762 is a swing check valve in which the design simplifies regrinding and provides for easy inspection of the disc. By removing side plugs from both sides of the body, the disc can be taken out for inspection. When worn, these plugs can be renewed. In this way accurate alignment of the hinge pin and disc is maintained.

Regrinding can be done without removing the valve from the line. An opening is provided in the body through which a screw driver may be inserted into a slot in the end of the disc. Regrinding is done then in the usual way.

Fig. 950 is a 200-lb. globe valve which is designed to close tight easily and to keep tight. The disc does not extend beyond the seat contact surface; so repeated regrinding cannot cut a shoulder or groove in the disc.

For jobs that require throttling or where conditions are unusually severe,



Bailey Pilot Valve for air operated control system

Fig. 956, a plug-seated type of valve may be had. This valve is said to offer the same advantages as the beveled seated type.

Only two interesting miscellaneous products developments, one a new pipe welding clamp, and the other, an Alundum rubber bonded safety thread, are to be mentioned.

The *pipe welding clamp*, known as the *"Bull Dog,"* is the development of *Oster-Williams*, Cleveland, Ohio. It is made at present in two sizes, one to handle pipe from 4 inches to 6 inches, and the other for pipe from 8 inches to 12 inches.

The *Alundum rubber bonded safety tread* is the product of the *Norton Company*, Worcester, Mass. As the name indicates, the tread is composed of an Alundum aggregate that is bonded in a base of rubber. The aggregate is used to provide non-slip effectiveness and it is claimed that it bonds perfectly and securely with the rubber giving a tread surface that is highly non-slip even at the nosing edge.

It has been possible to touch upon only a fraction of the work that has been done within the past year or so by equipment manufacturers, but it is hoped that the information that has been presented may indicate something of the creative effort that is constantly manifesting itself to improve industrial conditions.

T.A.P.P.I. Fall Meeting at Appleton

Many papers presented before well attended convention

THE eighteenth fall meeting of the Technical Association of the Pulp and Paper Industry was held on September 26, 27 and 28 at Appleton, Wis. It was called to order shortly after 9:30 o'clock on the morning of September 26 by Allen Abrams, president of the Association, and technical director of Marathon Paper Mills Co., in the Alexander Gymnasium of Lawrence College.

Institute of Paper Chemistry Papers

The meeting was then turned over to Dr. Harry Lewis of the Institute of Paper Chemistry staff. As chairman of the meeting, Dr. Lewis explained that all of the papers to be presented during the morning session of the first day were to be presented by students or staff members of the Institute. In fact, four of the six papers scheduled were Ph. D. theses of recent Institute graduates.

The first paper on the program, which was presented immediately following the few introductory remarks of Dr. Lewis, was entitled, *An Alkaline Process for Obtaining High Yields of Pulp from Aspen Wood*, and was presented by *Dr. R. L. Davis*.

Dr. Davis in his remarks described a process of soda cooking that had been developed and studied at the laboratory. The process consisted of an alkaline digestion with a low percentage and concentration of alkali followed by a first stage chlorination, an alkaline wash, and a final hypochlorite bleach.

It was said that yields of around 56 per cent of bleached pulp based on the wood might be obtained with this process where a rod mill was available for intermediate refining, or of 53 to 54 per cent where a rod mill was not available. The bleach consumed by these two types of cooks was stated to approximate 30 and 20 per cent, respectively. Black liquor, it was further suggested, might be used to make up the cooking liquor volume without any appreciable ill effect upon the pulp; softened chips blown from a semi-commercial digester with a two-inch blow line, the stock being disintegrated to pulp form; and further reduction of screenings to pulp easily accomplished by the use of a rod mill.

The results obtained by the use of a typical dilute kraft liquor, consisting of two parts of caustic soda to one part of sodium sulphite, were no better than those obtained by the use of a dilute soda liquor.

Two-stage bleaching, using chlorine in the first stage followed by an alkaline wash and completion of bleaching with hypochlorite, was found to be beneficial mainly in the amount of chlorine used. About 33 per cent of the total chlorine can be saved by this process.

It was not possible to obtain yields as high as quoted by the use of concentrated cooking liquors and a shorter cooking period.

The chemical tests on the pulps obtained by the use of dilute liquors followed by first stage chlorination bleaching were equally as good as those obtained on commercial pulps.

The bursting strength of the pulps produced by cooking with dilute alkaline liquors was from 50 to 100 per cent higher than that of commercial pulps. The tearing strength of the pulps was also higher than that of normal soda pulps.

A chemical balance showed that the method of cooking with dilute liquors followed by chlorination bleaching, an alkaline wash, and a hypochlorite bleach, was much more efficient in preserving the cellulosic portion of the pulp.

The opacity of the pulps in the unbeaten state was found to be about the same as the opacity of the commercial pulps. When beaten, the commercial pulps, which did not hydrate readily, had a greater tendency to retain their unbeaten opacity.

A beater run on a mixture of 50 per cent sulphite and 50 per cent soda pulp showed that the mixture containing the pulp prepared in the Institute laboratory was higher in bursting and tearing strength than the mixture containing the commercial pulps. Ash contents and opacities were higher on the mixture of commercial pulps. This, however, it was pointed out, could be offset by increasing the percentage of filler used, since the strength of the finished sheet would still be at least the equivalent of that obtained with commercial soda pulp.

Data relative to costs of manufacturing, effect of contamination of stock by rod mills, location in line of flow of defibering device, and possible competition of the new pulp with sulphite were among the subjects brought up in the discussion following the presentation of Dr. Davis' paper.

Following this discussion *Dr. E. H. Voigtman* presented his paper on *A Study of the Factors Influencing the Chlorination of Mitscherlich Pulp*. Dr. Voigtman pointed out that the concentration of the stock during the chlorination stage influenced the quality of the resultant pulp, especially at concentrations above 40 per cent. High concentrations, above 40 per cent, resulted in pulp having a lower cuprammonium viscosity, higher bleachability, higher lignin content, and lower alpha cellulose content. The final bleached pulps had the same cuprammonium viscosities, but their physical strength characteristics were lower and appeared to be directly related to the first stage viscosities.

Variation of the time or rate of chlorination did not affect the quality of the pulp.

When the temperature of the chlorinating gas was varied no changes in the quality of the pulp were observed. Varying the temperature of the mass of the stock resulted in changes in the quality of the pulp—the higher the temperature the lower the cuprammonium viscosity and the higher the bleachability. The action of hydrochloric acid under the conditions of concentration and temperature did not degrade the pulp.

Varying the amount of chlorine up to 50 per cent of the demand as indicated by the bleachability test resulted in no changes in cuprammonium viscosity. In cases where the chlorination exceeded 50 per cent of the demand there was marked evidence of degradation. Up to 50 per cent of the demand the chlorination and lignin removal was almost a linear function.

It was found that progressive chlorination reduced the lignin content, lowered the bleachability, and lowered the methoxy content from 0.8 to 0.4 per cent at which value the methoxy content remained constant, regardless of chlorination and amount of lignin present. Practically no change in pentosan content was noted upon progressive chlorination.

Potentiometric titration data, using the glass electrode, indicated that the chlorination reaction was almost entirely a substitution reaction, with the formation of hydrochloric acid equivalent to 50 per cent of the chlorine introduced. The above was found to exist when 50 per cent of the chlorine demand was used in the chlorination stage.

The chlorine balance showed that about 15 per cent of the chlorine introduced was bound with the lignin to form products which were insoluble in the acid residues, but soluble in water, or when the acid residues had been neutralized. This was true of the uncausticized liquor and pulp. After causticizing, almost all of the chlorine was found to be in the liquor.

A cellulose balance showed a loss of less than 0.5 per cent of Cross and Bevan cellulose. The Cross and Bevan cellulose residue contained almost as much pentosan material as the original pulps contained. On the basis of alpha, beta and gamma cellulose contents a

second balance was made. Correcting the alpha for its lignin content, a loss of 2.3 per cent alpha cellulose was discovered. The beta content of the chlorinated pulp increased 1.4 per cent and the gamma content about 0.2 per cent, making a net loss in cellulose of about 0.8 per cent.

A study of isolated lignins revealed that chlorination in carbon tetrachloride was not the same as chlorination in water. On the basis of a lignin molecule of 360 the carbon tetrachloride type of chlorination took up 4.5 to 5.0 atoms of chlorine per molecule of lignin, whereas the water chlorinated lignins took up from 2.3 to 3.0 atoms of chlorine per molecule. The solubilities of these differently chlorinated lignins varied greatly. The carbon tetrachloride chlorinated lignins were insoluble in water, insoluble in 5 per cent hydrochloric acid and only slightly soluble in 5 per cent potassium hydroxide, while the water chlorinated lignins were slightly soluble in water, practically insoluble in 5 per cent hydrochloric acid, and completely soluble in 5 per cent hydrochloric acid, and completely soluble in 5 per cent potassium hydroxide. The water chlorinated lignin sulphonic acid acted just as the water chlorinated lignins.

Several questions were asked Dr. Voigtman along the lines of his paper. One of them was whether there was any advantage in making the pulp alkaline before chlorination and the questioner was referred to an article which appeared in the German trade press on the subject. It was also asked whether any work had been done on the use of a dolomite lime instead of a high calcium lime. Dr. Voigtman stated in answer to this question that he saw no reason why dolmite lime might not be used if desired.

The third paper on the morning program of the first day was presented by *Dr. H. W. Bialkowsky* on *A Contribution to the Knowledge of Rosin Sizing.*

In conducting his investigations, Dr. Bialkowsky stated that measurements were made on the degree of hydrolysis of dilute sodium resinate solutions at concentrations that would be prevalent in the beater, and that the degree of hydrolysis was determined by the method employed by McBain for generally measuring the hydroxyl-ion concentration of soap solutions. It was found that commercial pulp fibers had a great tendency to lower the alkalinity of dilute sodium hydroxide solutions. A great reduction in alkalinity of the solutions occurred during the initial hours of contact with the pulp fibers. The lowering of the alkalinity was very appreciable for most commercial pulps in an N/500 sodium hydroxide solution, several pulps removing 80-90 per cent of the available alkalinity. The activity of a pulp to remove alkali appeared to be determined by the nature of the pulp, unbleached pulp exhibiting great activity toward alkali removal, bleached chemical pulp exhibiting an intermediate effect, and purified wood fiber and rag stock showing the lowest activities.

The behavior of commercial pulps toward dilute sodium resinate solutions was studied, results indicating that the various pulps had a variable action on these solutions. The amount of rosin liberated from the solutions and retained by the pulp fibers was dependent on the nature of the pulp. Pulp fibers which retained a relatively large amount of rosin showed a great tendency toward lowering the alkalinity of sodium hydroxide solutions. It was suggested that it was quite likely that the rosin found in the fibers was primarily the liberated, colloidal abietic acid, and that the nature of the pulp fibers appeared to be a rather important factor in the problem of rosin sizing.

The fourth paper of the session was presented only by title. It was a paper entitled, *Observations Relative to the Physical and Chemical Changes Taking Place in the Cooking of New White Rags*, and was to have been presented by *E. R. Laughlin.*

Results of joint work of *Dr. H. F. Lewis* and *B. L. Browining* were then given by Dr. Lewis in a paper entitled, *A Critical Study of Methods of the Determination of Alpha Cellulose.*

Dr. Lewis explained briefly the reason for undertaking the study and called attention to some of the comprehensive reports detailing the influence of variables and operating conditions on alpha-cellulose values, which have appeared in the recent literature. The total mass of evidence in the opinion of Dr. Lewis should be sufficient to indicate clearly the desirability of the adoption by the Technical Association of one and the same analytical method for the determination of alpha-cellulose in either pulp or paper.

In spite of the information available, said Dr. Lewis, there are three types of methods or modifications thereof in use in this country. The first method is described in the analytical methods of the Forest Products Laboratory. The second is Method T203m, the official standard method of T.A.P.P.I. for the determination of alpha-cellulose in pulp. The third is Method T429m, the T.A.P.P.I. tentative standard method for the determination of alpha-cellulose in paper. The second method is essentially the same as that recommended by the Division of Cellulose Chemistry of the American Chemical Society, while the third method is that employed by the United States Bureau of Standards for the determination of alpha-cellulose in paper.

Although the comparison indicates that the methods are similar in many ways, there are a number of important differences. Such differences include the matter of the effect of the time of mercerization, effect of dilution, and the nature of the washing operation. It should be noted that the above methods, in turn, differ in essential details from those employed in the European countries.

One characteristic of the various comprehensive reports on the determination of alpha-cellulose is the fact that practically all of the work has been carried out on cotton cellulose or on a high grade sulphite pulp. Consequently, in this work a wide variety of stocks was utilized. These included the following:

1—Rag Stock—No. 1 Muslin
2—Alpha Pulp
3—Bleached West Coast Sulphite
4—Bleached Kraft
5—Bleached Soda

Group picture taken at 18th Fall meeting of T. A. P. P. I., Sept. 26-28, 1933, at Appleton, Wis.

Among the variables studied were the following:

1—The effect of dilution prior to filtration on the alpha-cellulose isolated.

2—The effect of time of standing after dilution.

3—The effect of time of mercerization.

4—The effect of variations in temperature of mercerization.

5—Ratio of sodium hydroxide to pulp.

6—The nature and extent of washing.

The results of this study indicated that the method of the Pulp Testing Committee arrived more nearly and more easily at the actual alpha-cellulose content of the pulp analyzed than either of the other methods described earlier. In order to bring this method in line with the results of the work it was modified to some extent. Alpha-cellulose residues isolated by the modified method, when analyzed the second time, showed an alpha-cellulose content in the case of the rag stock of 99.55 per cent, in the case of alpha pulp of 99.09 per cent, with sulphite, 97.79 per cent, and with kraft, 96.35 per cent.

Dr. Lewis stated that further variables are being investigated, and that a final report will be prepared for the annual meeting of the Technical Association of the Pulp and Paper Industry.

To keep the program to schedule little time was given to discuss Dr. Lewis' paper, and he then called upon *Dr. B. W. Rowland*, also of the Institute staff to present a paper on *Colloidal Control in Starch Sizing*.

Dr. Rowland stated that the behavior of starch in the pulp furnish was considered in relation to the other ingredients of the furnish.

It was observed that colloidal alumina had the power of precipitating starch from a water dispersion, and that if this occurred in the presence of pulp, a mixed precipitate of alumina and starch would adhere to the fibres. It was suggested that this mechanism was of importance in starch sizing and that the addition of one-half of one per cent of alum for each per cent of starch, followed by a neutralization with caustic, resulted in a very material improvement in strength of sheet. Rosin and alum added to the neutral furnish thus obtained caused no reversal of the starch precipitation.

The principal advantages of such treatment in the opinion of Dr. Rowland, were improved Mullen, and an improved surface smoothness, and "feel." The disadvantages were somewhat lower tear and opacity. In concluding his remarks, Dr. Rowland also stated that the use of starch in the manner outlined gave a stock with the advantages of over-hydration without the disadvantages.

Several questions were asked of Dr. Rowland upon completion of his paper. One of them covered the point in the process where the starch was added. It was stated that starch was added to the beater after the beater had been finished. Then alum was added and neutralized by careful addition of alkali. Stock treated in this manner, it was repeated, might be sized in the usual manner with rosin and alum since there would be no reversal of the starch precipitation.

Ammonia was used as the neutralizing agent in the laboratory investigation but caustic soda was employed for the mill runs. Most of the work was done with tapioca.

Just previous to adjourning the morning session, which was concluded with the discussion period following Dr. Rowland's paper, Mr. Abrams commented upon the well prepared papers of the morning and also upon their excellent presentation.

Portland, Ore. Host for Fall Meeting

The clubhouse of the North Shore Country Club, located on Lake Winnebago about seven miles southeast of Appleton, was the rendezvous for all luncheon and dinner meetings, and to it the convention delegates hastily migrated from the Alexander Gymnasium. Here they learned that Portland, Oregon had been chosen as the convention city for the 1934 fall meeting of T.A.P.P.I. This fact was announced by Allen Abrams, who presided at the luncheon.

Research Program Necessary

An address covering "Research Attitude in Corporate Organizations," was then made by Robert E. Wilson, Standard Oil Company of Indiana. Early in his talk Mr. Wilson commented upon some of the definitions of research as given by C. F. Kettering and then stated that of the various definitions given by him he preferred the definition which might be expressed somewhat as follows: Research is finding out what you are going to do when you can't keep on doing what you are doing today.

He said that the research attitude or state of mind was necessary to meet the changing conditions of the times, and that a business organization to be successful should be permeated with this attitude.

According to Mr. Wilson there are broadly speaking two types of mind, namely, the conservative and the progressive. The conservative type of mind resists change, while the progressive type of mind has an inborn conviction that there is always a better way of doing things. Both of these types of mind should, in Mr. Wilson's opinion, be represented in each business organization since each serves as a balance wheel to the other.

It was pointed out, however, that the research attitude must start with the progressive type of mind, that contagious enthusiasm was necessary, and that the organization must be equipped to meet the times. To emphasize these points, he told of the work of an entomologist in studying the habits of pine tree caterpillars. The entomologist found that everything went well with the caterpillars as long as they were left to feed in their native habitat, but when a change in conditions was brought about, the caterpillars attempted to function in the same way as formerly and only after a breaking up of their numbers due to their apparent inability to cease doing things in the same old way a few of the caterpillars were able to locate their food supply.

To build a surviving organization Mr. Wilson said that it was first of all essential to have a proper staff organization. It was then necessary to establish research nuclei, and to keeping pushing research men out into contact with plant men and actually into plant positions. Furthermore, it was pointed out that effort to develop the research attitude in an organization should not stop with the foremen and heads of departments, but should reach the individual men in the plant.

Men should be instilled with the desire to be observant and to make suggestions. The presentation of original ideas should never be discouraged and some provision should be made for rewarding good ideas. Many good ideas in the words of Mr. Wilson came from men in the plant, often men without a technical training.

In concluding his remarks, Mr. Wilson illustrated through the use of a human interest story how the lack of the research attitude caused unnecessary effort and losses.

This address by Mr. Wilson was most favorably received, as was indicated by the spontaneity of applause following the completion of his remarks.

Inclement weather conditions made it necessary to delay the golf tournament and trap shooting contest that had been arranged for the afternoon, until the afternoon of the following day. In their stead two of the trips, including visits to paper mills in Neenah, Menasha and equipment manufacturers in Appleton were substituted.

The evening of the first day was given over to a dinner and smoker.

Forest Products Laboratory Day

On the morning of the second day, the meeting for the presentation of papers was called to order by Allen Abrams and then turned over to Dr. C. E. Curran, In Charge, Section of Pulp and Paper, Forest Products Laboratory, Madison, Wis., as chairman. Just as the papers of the preceding day were based on work of the Institute of Paper Chemistry, the papers of the second day covered a cross-section of the work in the pulp and paper section of the Forest Products Laboratory.

Dr. Curran first introduced Col. C. P. Winslow, Director of the Forest Products Laboratory, who made a few pertinent remarks about the laboratory and its staff. Then, he proceeded with the papers of the morning.

These papers, totaling ten, were presented in the following order.

The first paper, based on work by *C. E. Hrubesky* and *G. H. Chidester*, covered the *Penetration of Western Hemlock Chips by Calcium Bisulphite, Liquor*, and was presented by Mr. Chidester.

The work as explained by Mr. Chidester consisted of bomb-scale penetration studies (using ⅝-inch western hemlock (*Tsuga heterophylla*) heart-

wood and sapwood chips both in freshly cut and oven-dry conditions) made at constant temperatures of 110 deg., 115 deg. and 120 deg. C. with each of three cooking acids containing 3, 6 and 8 per cent total and 0.8, 1.20 and 1.20 per cent combined SO_2, respectively. These studies showed that penetration was accelerated by an increase in temperature and by an increase in the excess SO_2 content of the liquor, and that penetration was more rapid in the sapwood than in the heartwood and to a very slight extent more rapid in oven-dry than in moist wood. At the same time, the temperature at which the chips "burned" increased with a decrease in the acid concentration and moisture content of the chips. The only chips "burned" at 110 deg. C. were the moist sapwood chips when treated with the 8 per cent acid. The critical temperature above which the chips "burn" before penetration was complete appeared to be 110 deg. C. A penetration period of 2½ hours to 110 deg. C. was recommended, but if the temperature rise from 110 deg. C. was very slow, it was suggested that two hours of penetration will suffice since penetration will be complete before "burning" occurs.

Chemistry of the Alkaline Wood Pulp Processes—Is There a Critical Temperature for the Sulphate Process was the title of the second paper which was presented by *J. S. Martin* as the result of a joint contribution by *M. W. Bray, C. E. Curran* and himself.

In the investigation covering the subject of this paper some twenty-two digestions (both in autoclaves and in semicommercial apparatus) were made. Time and temperature of digestion only were varied. All other conditions were maintained constant.

For the four temperatures (180, 176, 170, and 160 deg. C.) chosen, which are within the range of commercial practice, no particular critical temperature which was noticably beneficial or detrimental to the resulting pulps was found for kraft pulping. It was suggested, however, that there was the possibility, that extremely high temperatures or prolonged cooking periods, even within the range of the temperature chosen, might result in greater differences in pulp characteristics than was found in the investigation. Such conditions, it was thought, could hardly be applied readily or economically with present commercial equipment.

For the several cooking periods chosen, the physical characteristics of the pulps cooked to approximately equal yields under the conditions selected, were found to be quite similar, irrespective of the temperature of pulping. The results of both autoclave and semicommercial pulping experiments in this investigation confirmed the findings of the Forest Products Laboratory in previously reported work where it was found that digestion temperature mainly affected the speed of the pulping reaction.

The third paper covered *Forest Products Laboratory Research on Paper Machine Variables*, and was presented by *W. A. Chilson* as a joint paper by *P. K. Baird* and himself.

Mr. Chilson explained that the Forest Products Laboratory initiated the program resulting in his paper for research control purposes and to supply the paper industry with quantitative data on the operating characteristics of a paper machine. This program has four objectives: namely, (1) the identification of process variable; (2) the development of methods and equipment for controlling the variables; (3) studies of the effect of variables on sheet properties; and (4) the design and manufacture of papers to meet the requirements of use.

Accomplishments to date included the identification of variables and the development of some methods and equipment.

Over one hundred variables have been identified not including those of the individual dryers. The stuff and white water systems have been placed under precise control. New multicompartment rotating dippers have been developed to measure the stuff and the white water, and all parts of the machine when pressure is applied are equipped with pneumatic cylinders.

An instrument depending upon electrical principles has been developed to indicate the draw or tension on the sheet between sections. Its construction is such that it can be readily adapted to the sections of commercial paper machines.

Among the recording devices already operating are those showing the temperature and height of the stock in the pond, the flat box vacuum, pressure on couch, presses and calenders, and the values of the draws.

It is planned to have all essential processing conditions recorded on a wide strip chart together with data on the sheet properties so that it would be an easy matter to analyze and control the processes and resulting products.

Mr. Chilson also presented the next paper as a joint contribution by *F. A. Simmons, P. K. Baird* and himself. It was based on the results obtained in studying the effect on sheet properties of a special type of modified cornstarch to a sized and unsized kraft furnish and was given the rather lengthy title of *The Influence of Stock Temperature and Hydrogen Ion Concentration on the Sheet Properties of Kraft Paper Sized with a Special Starch Sizing.*

In making this study a quantity of stuff was prepared and aliquoted to provide duplicate stuffs for each run. Beater and paper machine processing conditions, except in the case of the stock pH and temperature, were maintained constant for each run. These stock conditions were 4.5, 5.5 and 6.5 pH and 65 deg. Fahr. and 75 deg. Fahr.

The addition of 2 per cent starch was found to produce the following results:

(1) The bursting strength was increased as much as 26 per cent due to the addition of starch at the optimum conditions of 5.5 pH and 75 deg. Fahr. The minimum increase obtained was 12 per cent.

(2) The tensile strength was increased about 14 per cent when the pH values were 4.5 and 5.5 and the temperatures were 65 deg. Fahr and 75 deg. Fahr.

(3) The tearing strength was increased slightly when the stock pH was 4.5 and 5.5 and the temperatures were 65 deg. Fahr. and 75 deg. Fahr.

(4) The air transmission characteristics were not affected under any of the conditions maintained in the studies.

(5) The water resistance was not changed under any conditions of the tests.

It was further suggested that the effect on strength properties was greater when no rosin size was used with the starch, and that starch as a sizing material did not render the paper water resistant.

The next paper, a joint contribution by *C. E. Hrubesky, P. S. Billington*, and *P. K. Baird*, covered *Comparative Service Ability and Processing Effects of Oval Cast Iron and Circular Rods in the Rod Mill.* The paper was presented by Mr. Hrubesky, who stated in brief that rod mill charges of oval cast iron and circular steel rods, approximately equal in number, weight and surface area were compared with respect to their serviceability and milling effects on kraft pulp at 4 and at 8 per cent consistencies, at a constant speed of rotation of the mill of 27 r.p.m. With one exception, the properties of pulp due to beating were found to develop more rapidly and attain higher maximum values by the use of circular rods at each consistence than when milled with the oval rods. The exception was the development of tearing strength at 4 per cent consistence, which was greater with the oval rods. The power consumption required to reach a definite bursting strength was less with the circular rods because of the shorter time necessary.

The oval rods appeared to exert a pounding action, due to a piling up of the rods followed by cascading, rather than the rubbing or even rolling action exerted by the circular rods. In spite of this action, the oval rods appeared to be as resistant to chipping and fracture as the circular rods. Although oval rods were found to be inferior to circular rods for hydrating pulp, it was suggested that they may be proven to be superior for breaking up softened chips produced by semichemical processes.

The sixth paper was another joint contribution. It was a contribution by *C. O. Seborg, R. H. Doughty*, and *P. K. Baird* on *Effect of Relative Humidity on the Moisture Content and Bursting Strength of Container Boards*, and was presented by Mr. Doughty.

In this study the effect of relative humidity in the range from 0 to 97 per cent at 80 deg. Fahr. on the moisture content and bursting strength of four commercial container boards were determined.

Both the moisture content and the bursting strength of the container boards changed with relative humidity in a regular way, and exhibited hysteresis as the relative humidity was changed through a complete cycle.

Maximum bursting strength values were attained at a moisture content cor-

responding roughly to 40 per cent relative humidity on adsorption and 30 per cent on desorption. The bursting strength between 25 per cent and 65 per cent relative humidity fell off only about 5 per cent from the maximum values; outside this range the loss of strength became serious.

Calculating strength to a relative basis, in percentage of a maximum, and relating this to the moisture content rather than to the relative humidity inducing that moisture content, gave a uniform basis for comparing various sheets and various conditions of humidity.

The moisture content at which maximum strength was reached was a characteristic of the furnish of the sheet. Furthermore, the bringing of the sheets to a high humidity brought about a marked permanent increase of strength.

Mr. Doughty was also called upon to present the next paper, a paper entitled, *Some Factors Affecting Interweb Adherence of Single Plies Used in Laminated Sheets*, which resulted from the joint work of *Mr. Doughty* and *P. K. Baird*. In brief, the preliminary procedure involved the pressing of sheets under various pressures, joining them in pairs, while still wet, to form plies and then subjecting the joined sheets to various pressures. In studying the sheets thus produced, assuming the force necessary just to propagate separation of the plies after drying to be proportional to the interweb adherence; it was found that increased joining pressure increased the adherence; increased pressing pressure decreased the adherence; joining pressure had to equal pressing pressure to cause appreciable adherence; and the intraweb adherence was independent of pressure, and was the limit approached by the interweb adherence as the joining pressure was increased.

Capillary Rise of Water in Fibrous Sheets and Possible Applications was the subject of the next paper. It was presented by *F. A. Simmonds*. He told of the work of a number of earlier investigators, and described the method employed in the present investigation. As a result of the investigation, Mr. Simmonds concluded that there was a definite relationship between the time and the height of capillary rise of water in strips of certain types of pulp and paper sheets, and that this relationship can be used as a means of measuring the effective capillary diameter parallel to the upper and lower surfaces of a sheet.

With paper, the ratios of the values in one machine direction to the values in the other were suggested as a possible indication of the uniformity of the pores and sheet structure. Water was said to be unsuited for testing calendered and sized paper in the manner outlined because the sorption was too slow. In addition, it was suggested that a possible application of the swelling velocity coefficient of pulp might be employed for predicting the rate of beating.

The last two papers scheduled for the morning session of the second day were presented by *E. R. Shafer* and were the result of joint work by Mr. Shafer and *Matti Santaholma*, a student fellow from Finland.

The first of the two papers was entitled, *Chemical Properties of Screen Fractions of Black Gum and Slash Pine Groundwood Pulps*. This study, made on groundwood pulps having quite similar screen analyses but different papermaking properties, showed the lignin content to vary from fraction to fraction and to be higher in the finer fractions than in the coarser. The solubility of the fractions in one per cent caustic soda solution was also higher in the finer fractions than in the coarser. Neither the chemical constituents of the various fractions nor of the whole pulp appeared to have any bearing on the papermaking properties of the pulp. The differences in properties of the papers made from these pulps were, therefore, attributed to physical properties other than fiber size distribution.

The second of these two papers by Mr. Shafer, *Effect of Different-Sized Fibers on the Physical Properties of Groundwood Pulp*, was based on studies of the strength and suspension properties of groundwood pulps in relation to the dimensions of the fibers. The work was done by recombining screen fractions of a single pulp in various proportions. By this procedure, the effect of fiber size on the properties of the pulps was made to predominate and the average fiber length of the pulps was found to be related in a general way to nearly all of the usual strength and suspension properties. Relationships between screen analysis data and average fiber length were discussed and the mutual relation of these with strength and suspension properties were said to permit the employment of the screen analysis as an aid in evaluating pulp quality.

The number of papers presented and the time devoted to each of them allowed for some discussion. The drawmeter, mentioned by Mr. Chilson in his paper on paper machine variables, was discussed as to its sensitivity. It was explained that its sensitivity increased as the rate of machine speed increased. It was further pointed out that it was not unusual to find 10 per cent to 12 per cent increase in speed necessary from the wet end of a machine to the dry end to absorb the draw when operating on bond papers, and that the greater the draw, the more open the sheet. A suggestion was made that work should be done in studying the degree of dispersion of fibers in papermaking stock as it passes to the wire of a machine.

More specific information was requested on the kind of starch used in the study of kraft paper sized with a special starch sizing, and also on the method of preparing it. Mr. Chilson stated that the starch was of a highly modified sort, that cold water was used to prepare it, that the retention of the starch was approximately 50 per cent, and that 2 per cent starch based on the weight of the pulp furnish was used. It was further suggested that only enough alum, when no rosin size was used, was added to get the desired pH.

Information was requested on comparative costs of oval and circular rods for rod mills. The cost of these rods was said to be based on a price of so much per pound so there would be no price differential.

Considerable discussion followed the presentation of the two papers by Mr. Shafer. The method employed in screening the stock to obtain screen fractions, the nature of the screen, and the screening area were among the subjects that came up for discussion.

Dr. Curran, following the presentation of the previously mentioned papers, then introduced Dr. E. C. Sherrard, also of the Forest Products Laboratory staff, who briefly summarized the results of a lignin symposium which was held during the recent meetings of the American Chemical Society in Chicago. He also reviewed a paper on lignin studies that he presented at the same meetings in Chicago. In commenting on the paper Dr. Sherrard said that most of the work mentioned in the paper was done by Dr. E. E. Harris.

The remarks of Dr. Sherrard concluded the formal session of the second morning's program.

Kimberly Painting Unveiled

Within a few minutes, following the adjournment of this session, a large number of those in attendance assembled within the J. A. Kimberly Memorial Building to witness the presentation and unveiling of a painting of J. A. Kimberly by J. C. Kimberly, the donor of the building and son of J. A. Kimberly, one of Wisconsin's pioneer paper manufacturers. Dr. Henry M. Wriston, President of Lawrence College, accepted the painting for the college.

The afternoon of the second day of the convention was given over to a golf tournament, to trap shooting, and to mill visits.

At the banquet held that evening, Dr. Otto Kress, General Chairman of the Appleton meeting, was thanked by Allen Abrams, President of T.A.P.P.I. for the splendid job done, and for this work was the recipient of a gift given in behalf of the Association.

Third T.A.P.P.I. Medal Awarded

Dr. Otto Kress then presented the third T.A.P.P.I. medal to Ernst Mahler for his outstanding achievements in the field of pulp and paper making. The previous T.A.P.P.I. awards were made in 1928 to William H. Mason, inventor of the Masonite process, and to Ogden Minton, inventor of vacuum dryer for pulp and paper.

Mr. Mahler, the recipient of the 1933 medal of the Technical Association, received his training at the Technische Hochschule at Darmstadt, Germany. He came to this country in 1912 and was associated with the Badische Company in the capacity of technical expert from 1912 until 1914. He then became associated with the Kimberly-Clark Corporation of Neenah, Wisconsin,

and now holds the office of Vice President, Department of Manufacture, in this company.

The development and introduction of a bleached groundwood sulphite sheet for use in book, magazine, and rotogravure printing; the development of the whole field of cellucotton in all its ramifications and uses; and the fostering of the development of a circulating system for sulphite cooking are among the contributions in the field of pulp and paper making that are credited to Mr. Mahler. In the field of equipment manufacture, he is said to have contributed the high speed Niagara beater and to have introduced into this country many of the ideas and equipment in use in Europe, such as the Voith stock inlet, improved pulp screen, screw press, etc.

Mr. Mahler is actively interested in the field of education and serves as a Trustee of Lawrence College. Through his efforts and enthusiasm a group of Wisconsin executives established at Appleton, a post-graduate and research institution, The Institute of Paper Chemistry, affiliated with Lawrence College, and of which he has been President of the Board of Trustees since its founding.

Mr. Mahler in accepting the medal from Dr. Kress spoke briefly on the place of the technical man under N. R. A.; questioned if there could possibly be a brighter future than the one ahead for the technical man; requested the technical man to stay technical; and pleaded that the helping hand be extended to the technical man wherever needed.

Dr. Wriston, toastmaster at the banquet, then called upon R. S. Hatch of Weyerhaeuser Timber Co., G. E. Williamson of Strathmore Paper Co., and M. A. Krimmel of Hammermill Paper Co. in the order named as past presidents of T.A.P.P.I. Each of these men told briefly of the progress made by T.A.P.P.I. during the days of their incumbency.

Sensenbrenner Views Business Conditions

Following the remarks of these men, F. J. Sensenbrenner, President of the Kimberly-Clark Corporation was introduced as the principal speaker.

Mr. Sensenbrenner spoke on present business conditions. He placed the responsibility for unemployment in part on the speculative fever of '28 and '29, and to England going off the gold standard.

He outlined President Roosevelt's problems of building confidence (the keystone of credit structure), of balancing the budget, and of solving unemployment.

Fear, in the opinion of Mr. Sensenbrenner, ruled the action of many people and not the lack of funds to purchase. The sag in demand in certain lines since August he feels has been due to uncertainty of stable currency. He also feels that the program of the Government must succeed; that the President has given us the action or stimulus needed for recovery, and that confidence now in ourselves and in our country will help to put over the recovery program.

Sessions of Third Day

C. C. Heritage of the Oxford Paper Co. called the meeting of Thursday morning, September 28, to order and then requested *J. D. Miller*, Chief Chemist, York Haven Paper Co., York Haven, Pa., to present a *Report on Tests of Regular and Stabilized 18-8 Alloy Welds in Sulphite Liquor*. This report was by the T.A.P.P.I. Materials of Construction Committee of which committee Mr. Miller is chairman.

Mr. Miller in making his report stated that welded specimens of high carbon, low carbon and titanium stabilized low carbon 18-8 chromium-nickel-iron alloys were tested by exposure to sulphite liquors and to acid copper sulphate solutions; and that specimens of the regular low carbon and stabilized low carbon 18-8 alloys were also tested after having been held at 1200 deg. Fahr. for 200 hours. Weight loss measurements, microscopic examinations, torsion tests and measurements of changes in electrical resistance were said to be used to determine the extent of corrosion of the various specimens. It was concluded as a result of this work that the regular low carbon and titanium stabilized low carbon 18-8 alloys can be used in the welded condition without suffering intergranular corrosion by sulphite liquor; that the titanium stabilized alloy was resistant to intergranular attack even under the most unfavorable conditions and should be used where the slightest degree of sensitivity to intergranular attack must be avoided; that high carbon 18-8 alloys should always be heat treated after welding and before being used in sulphite service; and that exposure to boiling sulphuric acid copper sulphate solution provides a relatively rapid method of determining the probable resistance of 18-8 alloys to intergranular attack by sulphite liquor over prolonged periods of service.

The second and third papers on the program of September 28 were presented by members of the Forest Products Laboratory staff. F. A. Simmonds presented the second paper, and R. H. Doughty, the third.

Mr. Simmonds' paper resulting from joint work of *R. H. Doughty* and himself, covered the *Application of Elementary Statistical Methods in the Testing of Pulp and Paper*.

Mr. Simmonds stated that a series of pulp or paper tests, generally speaking, represented values obtained from comparatively small samples of an exceedingly variable material by means of methods, the precision of which was frequently unknown. In studying such data, certain questions arose as to the precision of results, the number of tests to be made, the variability of properties of the material, the factors which influenced this variability, the significance of observed differences in results, and as to means of handling a large number of observations in convenient form.

Statistical methods, according to Mr. Simmonds, can be applied to the task of answering these questions. He then proceeded to demonstrate through the use of formulae and graphs how these methods might be applied and how the resultant data might be interpreted without the necessity of laborious reference to the general literature on the subject.

Mr. Doughty's paper discussed *A Comparison of Sheet Machines for Pulp Evaluation*. This paper was the result of joint work by *C. E. Curran* and *R. H. Doughty* in comparing the relative merits of five different machines for making test sheets.

It was found that the center area of test sheets was of about equal uniformity, regardless of the machine used. In detailed tests of the entire sheet area, however, small round sheets were found to be most uniform.

The actual test values given by the several machines varied considerably and in a random manner, when pulps were considered individually; but when the entire mass of data was averaged, a regular gradation of values was observed.

It was suggested that one of the machines be adopted as the ultimate standard for unprocessed pulps, and that work be undertaken to improve its applicability to processed stuffs of all types. It was further suggested that an operating procedure and tolerances for results be adopted, under which any of the machines tested might be used as a secondary standard.

Miss R. M. Cobb, Research Chemist, Lowe Paper Co., Ridgefield, N. J., presented the next paper, a joint contribution by *D. S. Chamberlin* and *B. A. Dombrow* of National Oil Products Co., Harrison, N. J., and herself on *Emulsified Paraffin Wax Sizes*.

Miss Cobb discussed in some detail the problem of emulsifying wax in water. In this discussion, the work required to disperse wax in water, mechanical vs. spontaneous dispersion of wax, specific nature of emulsifying base, interfacial tension between emulsifying agents, base and paraffin, and the preparation of emulsion by method of inversion were the major points touched upon.

Then she proceeded to describe the properties of the spontaneous emulsions, and the use of wax size in the paper mill. These emulsions were said to be stable in ordinary concentrations over a pH range of 3.0 to 10.0, the lower pH concentrations being obtained by the use of acid. It was also pointed out that the efficiency of wax and wax-rosin sizes was more dependent upon high temperature than that of rosin sizes alone; that rosin continued to be superior to wax and wax-rosin combinations until a temperature of 80 deg. C. was maintained, at which point wax and wax-rosin sizes were as effective as rosin sizes, pound for pound; and that the efficiency of all-wax and wax-rosin sizes depended upon the pH at which the size was set and the pH at sheet formation as much as does the efficiency of rosin size.

According to Miss Cobb, the advantages obtained by the use of wax size included the following:

(1) Improved finish and flexibility.

(2) Greatly improved quality feel.

(3) Increase in water-resistance without loss of flexibility if wax size is properly set at right temperature.

(4) Improved printing quality due in part to finish and in part to ink-resistance of paraffin wax.

The three papers that immediately followed the paper by Miss Cobb dealed with the subject of color. The first of the three was entitled, *Usefulness of Pulp Color Measurements in Papermaking*, and was presented by *L. C. Lewis* of the Mead Corporation. Mr. Lewis used numerous lantern slides to illustrate his paper, but in his oral presentation he explained the part that color measurement played in papermaking as a whole, and suggested the necessity of establishing standards and tolerances. He felt that it was necessary to polish up present reflectance methods, and that pulp should be specified by reflectance, transmission, and absorption.

R. S. Hatch of Weyerhaeuser Timber Co. presented the next paper as a joint contribution of *H. A. Hauff* and himself. It was entitled, *The Razek-Mulder Analyzer and Its Use for Measurements of Color in the Paper and Pulp Industry.* This paper, like the one immediately preceding, was developed largely through the use of lantern slides.

Mention was made of the rapid progress of the past few years in developing means for physically measuring color. This progress was said to enable the specification of color in a definite manner.

The use of the Razek-Mulder analyzer permitted a photographic record of the standard to be made and compared with samples being tested. He showed numerous examples of color curves for both pulp and paper to illustrate the range of the instrument.

E. S. Bissell of the Bausch & Lomb Optical Co. presented the third of the papers on color in his paper entitled, *A New Color Comparator.* In his early remarks he gave some fundamental data on color and explained the Munsell system with its color attributes of hue, brilliance or value, and chroma.

Through the use of one of the Bausch & Lomb color comparators that was on exhibit, he then briefly described the instrument and told how it functioned.

The last two papers on the morning program of September 28 included one by *B. E. Lauer* of Northern Paper Mills on *The Commercial Evaluation of Pulp Cord-Wood*, and one by *M. A. Heath* of the Forest Products Laboratory on *Analysis of Alkaline Black Liquors of Varying Sulphidity by the Ammonia Distillation Method.*

Mr. Lauer explained that the purchase of pulpwood on the commonly used cord basis involved the use of a measurement which, depending on several factors, might give widely variant results for the actual quantity of wood included in the unit. In the opinion of Mr. Lauer, to provide a positive means of comparison of different woods for the purpose of computing pulp yields and comparative wood costs, there must be a means of accurately determining the quantity of wood per cord.

Any method, said Mr. Lauer, by which the cord measure may be equated to the more definite and comparable weight basis must include a determination of the volume of wood per cord and the dry wood density per cubic foot. Two methods for determining these values were then described.

The paper by *Mr. Heath*, a joint contribution by *M. W. Bray, C. E. Curran* and himself, described a method which had been developed at the U. S. Forest Products Laboratory for the analysis of soda and sulphate spent liquors by distillation with ammonium chloride. This method appeared to give accurate and reproducible results over a range in sulphidity varying from zero to 100 per cent.

Data comparing this improved method with the old direct titration method for two series of bomb scale sulphate pulping experiments of two different degrees of alkalinity showed that the free alkali remaining in black liquor was low and that for sodium sulphide was high and irregular for the direct titration method. In addition the data showed the extent to which black liquors changed in sulphidity and alkalinity on storage, the sodium hydroxide generally increasing at the expense of the sulphide. The pulping data in this investigation clearly indicated that the ratio of caustic to sulphide might be varied from 0 to 100 per cent sodium sulphide without experiencing the phenomenon of pulp "burning" or of materially darkening in color provided the alkalinity was maintained constant and an excess of free alkali was present in addition to that required for delignification.

This paper by Mr. Heath completed the formal presentation of papers at the meeting. The afternoon, following luncheon at the North Shore Country Club, was given over to mill visits and golf and thus was concluded the eighteenth annual fall convention of T.A.P.P.I.

No report of the meeting, however, would be complete without at least a mention of the ladies' program. This program included golf, contract bridge, auction bridge, sightseeing tour, style show, trip through the Institute of Paper Chemistry, and a joint dinner and luncheon with the men.

A list of registrants at the convention revealed that approximately 300 T.A.P.P.I. members and guests had trekked to Appleton for this meeting. They came from the East, the near South, the Middle West, the West, and also from Canada. Surely, Dr. Kress and his committee are deserving of much credit for their efforts in making this meeting a success.

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◆ THE HERMAN MFG. Co., Lancaster, Ohio, has secured the manufacturing and sales rights on the Unkle Screen and the Unkle Improved String and Rag Catcher. The company will welcome inquiries regarding this equipment.

◆ Association of Pulp and Paper Mach'y Mfrs.

The National Association of Manufacturers of Pulp and Paper Machinery and Equipment was organized at a meeting held on Thursday, September 28, at the Commodore Hotel, New York City.

The following officers were elected to serve until the annual meeting next February:

President, Phillips Dennett, president of the Bird Machine Co., South Walpole, Mass.; vice-president, Charles L. Bauer, president of the Bauer Brothers Co., Springfield, Ohio; treasurer, W. B. Wilshusen, secretary of the Cameron Machine Co., Brooklyn, N. Y.

The Board of Directors, in addition to the three officers, are: J. E. Waterhouse, general manager, Montague Machine Co., Turners Falls, Mass.; A. B. Clark, president, J. O. Ross Engineering Corp., New York City; L. L. Foss, purchasing agent, Union Machine Co., Fitchburg, Mass.; S. G. Bevis, president of Bevis Machine Co., Middletown, Ohio; Samuel M. Langston, president of S. M. Langston Co., Camden, N. J.

The Constitution and By-Laws for the organization and a Code of Fair Competition were discussed and tentatively approved at the meeting for final ratification by the members. The Code will be presented for the approval of the Recovery Administration at Washington as rapidly as possible.

◆ Superintendents Organize Pacific Coast Division

Members, friends and eligibles of the American Pulp & Paper Mill Superintendents Association held a meeting at the Olympic Hotel, Seattle, Wash., September 9, for the purpose of forming a Pacific Coast Division of the association.

The purpose of the meeting was accomplished and plans were laid for the future activities of the Division, and for a membership drive. This division already has thirty members, most of whom have up to now been affiliated with the Northwestern Division.

The following were elected as officers of the new division: Chairman, H. Robert-Heuer, Weyerhauser Timber Co., Longview, Wash.; first vice chairman, C. J. Armbruster, Puget Sound Pulp & Timber Co., Everett, Wash.; second vice chairman, Ferdinand Schmitz, Jr., Rainier Pulp & Paper Co., Shelton, Wash.; third vice chairman, Hawley Pulp & Paper Co., Oregon City, Ore.; secretary-treasurer, H. A. Des Marais, General Dyestuff Corp., Portland, Ore.

◆ J. M. Spitzglass

J. M. Spitzglass, vice-president of the Republic Flow Meters Company, Chicago, passed away October 1, at the age of 64 years.

Mr. Spitzglass was born in Russia, having come to this country about thirty years ago. He had invented a liquid flow meter and several other devices for which he was widely known.

A widow and two sons survive.

Twenty-Second Annual Safety Congress

PERHAPS never in the history of the annual gatherings of the National Safety Council has there been one so eventful as the Twenty-Second Annual Congress which was held in Chicago October 2 to 6. Perhaps never has there been such a combination of events equaling that witnessed by those attending the Congress that week.

While the opening sessions of the Congress were under way in the Stevens Hotel, near that miracle city, "A Century of Progress," the President of the nation rode through the city streets on his way to deliver an address before the American Legion convention. Later in the day, the safety sessions were held to accompaniments of music which floated through the open windows as band after band passed down Michigan Avenue to point of formation for the Legionnaires' parade. Monday night, the 2nd, and nearly all day Tuesday, the 3rd, they passed by—a valiant army of brave men; men who kept our country safe; men who fought to preserve the peace of the world, and returned home safe. And hovering over this tremendous demonstration, was the spirit of safety. There was order, caution, and consideration. The people of the country were on a holiday, but they did not forget the safety of their countrymen.

In formally opening the annual meeting of members on Monday morning, J. J. Banash, president of the National Safety Council, paid tribute to the American Legion and the famous "40 and 8," after which he asked for a rising silent tribute to the World War soldiers who went over the top but did not come back.

In his presidential address, Mr. Banash brought out some interesting and important points concerning the safety movement in connection with the National Recovery Administration. He said in part:

"It is quite apparent to all of us that we are now in the midst of changes which may alter our social and economic order. Plans contrary to accepted principles of past generations are now under consideration for our economic rehabilitation. What the eventual outcome will be no one can prophesy with certainty, but we are without doubt now witnessing one of the finest examples of co-operation since the War. Certain drastic conditions now in effect demand the best thought of every executive to aid in accomplishing the aims of the National Recovery Act. While some may have doubted the advisability of certain provisions of the act, personal opinions and political differences are being forgotten in an effort no less patriotic than that of winning the War, and the country has rallied under the Blue Eagle in a wholehearted effort to remedy our economic ills.

"How will the Industrial Recovery Act affect the safety movement? The paragraph in the Basic Codes of Fair Competition published by the Federal Administration does, indeed, recognize safe and healthful working conditions as essential of fair competition. This will undoubtedly increase the prestige of safety work. It will also break down some of the resistance to accident prevention efforts. On the other hand, we must not delude ourselves with the idea that the mere inclusion of this paragraph in any code will work miracles. It will be of little value if we relax our efforts.

"The safety movement cannot control the legal phases of the problem. It is controlled solely with the preventive side. It brings together the engineer, the physician and the personnel worker so that all angles of the problem may be studied and remedied.

"Much research work will be needed as science develops new processes for industry. Only through knowledge of the facts can justice be rendered to both worker and employer. Our knowledge of the effect of many industrial processes and materials on the health of the worker is still vague and many cases have been decided on emotion rather than reason. While our human sympathies are naturally with the victim of injury or disease, we must realize the unsoundness of a policy that may penalize an industry for a disability not caused by occupation. . . .

"Under the National Recovery Administration it does appear that business will suffer less from the competition of those who cut costs by exploiting labor, but at the same time prices must be kept within the public's ability to buy. The total cost of labor and even of material may increase, but still to keep going industry must show a profit. For these reasons the savings through the actual reduction of accidents and increase in the health and general well-being of the worker will be needed even more in the future than in the past."

Paper and Pulp Section

Notwithstanding the diverse attractions offered for the entertainment of those in attendance at the convention, the meetings of the Paper and Pulp Section were well attended. Several familiar faces were missing, but those who had come were obviously earnest in purpose and had one definite objective—the hope that they would learn in these meetings some valuable lessons to take home to the workers in their respective mills.

Under the leadership of the Chairman of the Section, J. J. Pizak of the Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis., the meetings of the Section which were held Monday afternoon, Tuesday morning and Thursday morning, were marked with a note of optimism and progress. Discussions of the subjects presented were not lengthy, but generally touched upon matters that have caused safety directors much concern. Mechanical hazards on paper mill equipment has long been a grave topic at safety meetings; this subject was again discussed in all of its phases resulting in the exchange of some new and valuable ideas among those present. Some of the speakers dwelt upon the seeming indifference of management to the cause of organized safety. One speaker strongly emphasized the point that safety cannot be considered merely an attachment such as is often purchased to hook onto some piece of equipment, but that it must be built into the working program of the plant by management itself, just as the starter is built into an automobile. The subjects of safety education and the psychological aspect of accident prevention were the themes of several of the addresses, proving that the program had indeed been carefully planned and all angles of the question given thoughtful consideration.

Chairman Pizak Views the Past, Present and Future

Chairman Pizak, who has given a great deal of time and study to the operation of effective safety methods, addressed the Section at the opening of the first session on Monday afternoon on the subject "Past, Present and Future of the Paper Industry." The Chairman made an earnest plea for collective co-operation which would mean the defeat of individualism within the ranks. He spoke in part as follows:

"The past, the present and the future are three separate worlds—we can't live in all three—but we can live in one and guided by the experience of the past we can mould our lives for the future. Someone has said that the man who lives in the present, forgetful of the past and indifferent to the future, is the man of wisdom. That may be questioned. True enough, the best preparation for the future is to do the best we can today, but we can also use the experiences of the past to guide our way.

"As to the past, present and future of our Section, you know the past—you yourselves wrote its history; the present is here, in this room; the future is in your hands; see that you build your patterns carefully.

"Two years ago we set up certain objectives. Some of these were carried

out; in others we failed. Our ultimate success is measured by the net results of our accomplishments. In your hands is the yardstick—not *individually*, but *collectively*. Individualism is gone; we are awakening to a dawn of collective co-operation. Are we prepared to accept it? If so, will we remain true to our obligation?

"The chaos of the past few years should have brought us to a realization of the fact that individualism is a departure from completeness. If it has not, we are doomed—doomed to failure. We are allowing an edifice to be torn down—one that was founded and based on the one sane and unselfish thought—the *preservation of life and the promotion of health among our industrial workers*.

"Fearing that the depression had left us scarred with indifference, I wrote letters to a representative number of our Section for their criticisms and suggestions. Summarizing the replies received, I found that we have become victims of individualism. We are indifferent, selfish, and possessed with a desire to evade responsibilities. It is true that economic conditions have had a great deal to do with our problems, but are not entirely responsible for them.

"From now on, let us replace individualism with collective co-operation, indifference with eagerness, selfishness with beneficence; and there will then be no buck-passing. Let us set up a wide-awake section of committees; let us cull out the non-productive committees and concentrate on the active ones; perhaps the consolidation of several committees into one may help.

"Next, we should set up an agency for the exchange of our ideas and the solution of our problems. By this experience exchange we shall all profit. And last, but not least, we must re-establish the old spirit of good fellowship among our members."

Contest Data and Announcement of Winners

The Eighth Annual Contest of the Section in which the majority of the mills participate closed June 30, 1933. This was the second contest that has covered a twelve-month period; former contests were effective over a period of six months only. The presentation of contest data always brings a few moments of intense interest and expectancy. Representatives of mills who know their record to be good eagerly await the news of an award which they may take home to the men who have made these records possible.

At the opening session of the Section on Monday afternoon, the data on the contest which closed June 30 was presented by A. Scott Dowd, chairman of the Contest Committee. Mr. Dowd's report is reproduced herewith in full.

Members of the Paper and Pulp Section of the National Safety Council:

Another Congress has brought us together where we can rub elbows and swap experiences. To one who is just within the boundary which surrounds the activities of our splendid Section, *The News Letter* has seemed a wonderful medium of news, chat and information which enables you to extend your knowledge and influence beyond the spheres in which you carry on your respective duties. The Annual Safety Contests have given you those opportunities of fair and friendly competition with each other that auger ever increasing perfection in the reduction of accidents if you persistently maintain the spirit of achievement.

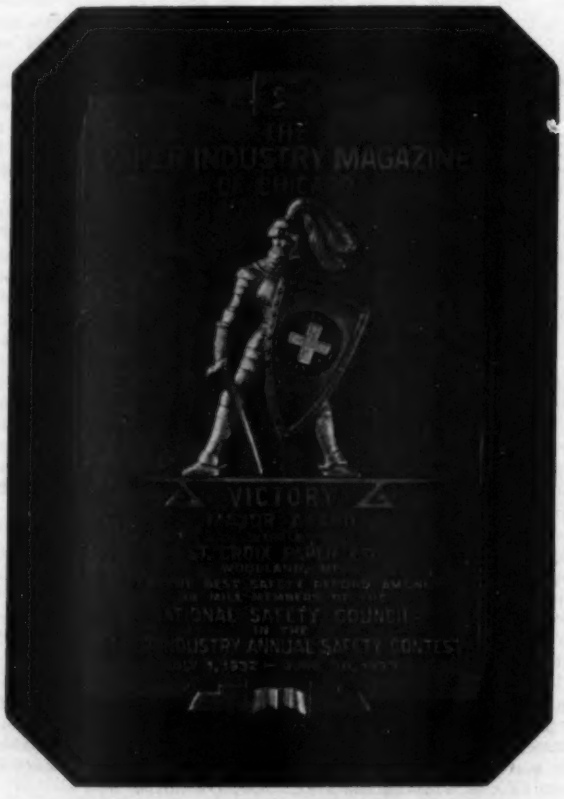
We have concluded the second contest of a twelve-month period and are now in the third, which is the ninth consecutive annual competition among the mill members of our Section. Each of these past eight annual events have produced greater achievements. True, the number of mills that participated in the last contest were less than in former years, yet it is clear that the reason for this has been the condition of the industry itself. In spite of reductions and curtailments that have taken place, some definite progress has been made in the prevention of accidents. Twelve and one-half per cent of the mills that finished the Contest last June made perfect scores of no accidents—a total of 11. In the previous contest, only 9¼ per cent of those that finished were perfect—a total of 9.

There were nearly 14 million less man-hours worked in the past twelve months, compared with the previous period, but, on the other hand, there were 2,255 more employes engaged, and only 87 mills finishing in the late one, compared with 97 mills in the former contest. The decrease of mill participants was in Groups B, C and Division II; Group C having the greatest decrease. Gains were made in Groups A and D, which were double the number in those groups in the previous year.

The number of disabling injuries was far less than in the year before, but the lost time was exceedingly greater. Some reason for the latter lies in the fact that in all contests prior to 1932-1933, the Standard Scale of Time charges was not used for deaths, permanent disabilities and permanent partial disabilities. Only one-sixth of the scale charge for specific injuries was used. On July 1, 1932, the standard scale was adopted.

The average frequency rate has been steadily decreasing during the past eight years. There were 53 mills with frequency below average in the late contest and 71 mills with severity below average. The ratio of employes to accidents was 42 to 1, and non-fatals to fatals was 83 to 1. Both of these ratios were a considerable improvement over the previous year.

The following mills have won trophies and certificates which will be awarded to them by the National Safety Council for having attained ranking positions in their respective groups:



Major Trophy Awarded by The Paper Industry

Division I—Paper and Pulp Mills

Group A

Rank 1—*Hollingsworth & Whitney Co.* (Algonquin and Toconnet mills at Waterville, Maine.)

Sulphite pulp mill and six-machine paper mill manufacturing specialties. Record of 4 injuries—312 days' lost time. This mill was placed on the Honor Roll in the National Safety Council tabulation of Accidental Injury Rates for the year 1932 among mills in its class for having made the largest consistent improvement in frequency since 1930—96 per cent; also in severity—99 per cent.

Rank 2—*International Paper Co.* (Otis mill at Chisholm, Maine.)

Groundwood and sulphite pulp mill and 11-machine paper mill making newsprint and mill wrappings. Record of 9 injuries—201 days' lost time.

Rank 3—*International Paper Co.* (Continental Division at Rumford, Maine.)

Sulphite and groundwood pulp mill and 10-machine paper mill manufacturing specialties. Record of 8 injuries—297 days' lost time.

Group B

Rank 1—*St. Croix Paper Co.* (Woodland, Maine.)

Groundwood and sulphite pulp mill and 3-machine paper mill manufacturing newsprint. Record is a perfect score of no injuries during term of the contest. This mill was listed in the N. S. C. Honor Roll for having made the best record among the large newsprint mills in 1932—751,000 man-hours without a disabling injury.

Rank 2—*Fraser Companies, Ltd.* (Madawaska, Maine.)

Six-machine paper mill making paper and board specialties. Record of 1 injury—24 days' lost time. This mill was listed in the N. S. C. Honor Roll for having the best 1932 frequency and severity rate among its class of mills; also the largest improvement in frequency from 1930 to 1932—94 per cent, and severity—98 per cent.

Rank 3—*The Champion Coated Paper Co.* (Mill No. 2, Hamilton, Ohio.)

Paper mill manufacturing book and specialties. Record of 2 injuries—78 days' lost time. This mill was listed in the N. S. C. Honor Roll for having made the lowest severity rate among the large units of its class.

Group C

Rank 1—*Cornell Wood Products Co.* (Cornell, Wisconsin.)

Groundwood pulp mill and 2-machine board mill. Record is a perfect score of no injuries during term of the contest. This mill operated without an accident since June 19, 1930, and therefore won first place in this group according to Rule 6(a). This mill was listed in the N. S. C. Honor Roll for having made the largest improvement from 1930 to 1932 of mills in its class—100 per cent in each rate.

Rank 2—*Consolidated Water Power & Paper Co.* (Interlake Div., Appleton, Wisconsin.)

Sulphite pulp mill. Record is a perfect score of no injuries during term of the contest. This mill operated without an accident since January 15, 1932, and therefore won second place.

Rank 3—*Consolidated Water Power & Paper Co.* (Biron mill, Biron, Wis.)

Three-machine paper mill making newsprint and wall paper. Record of 3 injuries—12 days' lost time.

Group D

Rank 1—*International Paper Co.* (Riley Mill, Riley, Maine.)

Groundwood pulp mill. Record is a perfect score of no injuries during term of the contest. This mill operated without an accident since March 17, 1926, and therefore won first place in this group.

Rank 2—*United States Gypsum Co.* (No. Kansas City, Mo.)

Manufacturers of chip board used in making wall board. Record is a perfect score of no injuries during term of the contest. This mill operated without an accident since January 1, 1931, and therefore won second place.

Rank 3—*Port Huron Sulphite & Paper Co.* (Sulphite pulp mill, Port Huron, Mich.)

Record is a perfect score of no injuries during term of the contest. This mill operated without an accident since March 4, 1932, and therefore won third place.

Rank 4—*International Paper Co.* (Livermore mill, Livermore Falls, Maine.)

Groundwood pulp mill. Record is a perfect score of no injuries during term of the contest. This mill operated without an accident since May, 1932, and therefore won fourth place.

Division II—Remanufacturing

Rank 1—*Kimberly-Clark Corporation* (Atlas mill, Appleton, Wis.)

Record is a perfect score of no injuries during term of the contest. This mill operated without an accident since April 6, 1931, and therefore won first place in this group.

Rank 2—*Container Corp. of America* (Natick mill, Natick, Mass.)

Record is a perfect score of no injuries during term of the contest. This mill operated without an accident since October, 1931, and therefore won second place.

Rank 3—*Consolidated Water Power & Paper Co.* (Stevens Point, Wis.)

Record of 1 injury—23 days' lost time.

The rules of the present contest, as you know, are the same as those which governed the former one, except that in Rule 6(a) this now provides in the event of a tie (two or more perfect scores), "the winner of said group shall be the mill, among those tied, working the greatest number of man-hours in the period of the contest."

The severity rate given in Rule 5 has also been changed to conform to the Standard Scale of Time charges now being used.

July scores—the first reports of present mill contestants, totaled 83. There were ten more mills on the list, however, which made a total of 93. These ten had not sent in their reports at the time the scores were published in the September issue of THE PAPER INDUSTRY.

In conclusion, be it expressed, as it has many times before, that THE PAPER INDUSTRY enjoys the privileges of participating in the work of this Section. It is grateful for the friendships that have been formed and the co-operation received in continuing these annual contests which have proved so highly instrumental in reducing accidents in pulp and paper mills.

Presentation of Trophies

The presentation of awards at this session became an auspicious occasion when W. J. Brennan, Safety Engineer, State of Maine, announced that Governor Brann of the State of Maine was present. Chairman Pizak greeted the Governor and introduced him to the Section. J. J. Banash, president of the National Safety Council, stepped to the platform and asked Governor Brann to preside at the presentation of trophies to winners in the State of Maine. The Governor was particularly pleased to learn of the splendid record made in safety by the paper mills of his State. Of the five bronze plaques awarded to group winners by the National Safety Council, three were presented by the Governor to Maine paper mill representatives; four certificates were also awarded by the Council to mills in that State for outstanding safety performance. Governor Brann remarked at the close of the ceremony that it was often said "As goes Maine, so goes the Nation," and he earnestly hoped the safety records established by paper mills in the Pine Tree State would set a precedent in safety leadership, as well as political.

Awards of trophies and certificates outside the State of Maine were made by J. J. Banash, president of the National Safety Council, who congratulated the Section for its splendid record during the term of the contest.

Trophies were awarded to group winners as follows:

Division I—

Group A—Hollingsworth & Whitney Co., Waterville, Maine.

Group B—St. Croix Paper Co., Woodland, Maine.

Group C—Cornell Wood Products Co., Cornell, Wis.

Group D—International Paper Co., Riley, Maine.

Division II—

Kimberly-Clark Corp., Appleton, Wis.

Certificates of merit were also presented to mills finishing in second and third place in the different groups, with the exception of Group D, Division I. In this group, four mills had perfect scores for the term of the contest; therefore, three mills in this group received certificates from the National Safety Council. Certificate winners were:

Division I—

Group A—International Paper Co., Chisholm, Me.; International Paper Co., Rumford, Me.

Group B—Fraser Companies, Ltd.,

Madawaska, Me.; The Champion Coated Paper Co., Hamilton, Ohio.

Group C—Consolidated Water Power & Paper Co., Appleton, Wis., and Consolidated Water Power & Paper Co., Biron, Wis.

Group D—U. S. Gypsum Co., No. Kansas City, Mo.; Port Huron Sulphite & Paper Co., Port Huron, Mich., and International Paper Co., Livermore Falls, Maine.

Division II—

Container Corp. of America, Natick, Mass., and Consolidated Water Power & Paper Co., Stevens Point, Wis.

The Paper Industry Trophy

As the winners in the various groups become known, there is always still further expectancy over the award of the major trophy. This trophy is presented each year by E. B. Fritz, publisher of THE PAPER INDUSTRY, to the group winner which has, in the opinion of the contest judges, made the best safety record of all the group winners.

Near the close of the presentation ceremonies, Chairman Pizak asked Mr. Fritz to step to the platform and unveil THE PAPER INDUSTRY trophy. Mr. Fritz spoke of his interest in the contests and congratulated the Section on the record made during the past contest. He then said the judges had awarded the trophy, a handsome plaque, to the St. Croix Paper Company, Woodland, Maine, winner of first place in Group B, Division I. Unfortunately, the representative of this company was prevented from being present, but W. J. Brennan, formerly safety director of that company and now Safety Engineer of the State of Maine, accepted the trophy in behalf of the St. Croix mill, and immediately wired them the news of their victory.

General Business

The business matters of the Section consisted principally of committee reports and election of officers.

Arthur Murray, chairman of the Membership Committee, reported a total of 162 members in the Section as compared with 187 members a year ago. Six new memberships have been recorded and 31 cancelled.

Arthur E. Winslow, *News Letter* Editor and chairman of the Publicity Committee, spoke of the decision of the Executive Committee at its February meeting that the outgoing editor should prepare and issue the October number of the *News Letter*, the newly elected editor beginning his term with the November issue. Mr. Winslow had with him the October issue of the publication which will be sent to members at the usual time. This was read by Mr. Winslow at the opening session on Monday afternoon. The material prepared by Mr. Winslow was partially a resumé of ideas gleaned by him through his experience as editor during the past year. He set up the value of the *News Letter* as a means of exchanging ideas among the members and expressed the thought that the interest of many had not been aroused to the importance of this means of communication. He felt that this was partly due to the lack of a specific program. Mr. Winslow expressed the belief that safety *can* become a science. One suggestion incorporated in the wealth of ideas expressed by the speaker was that employees should be analyzed and classified psychologically, and placed in situations which best fitted their type. He emphasized that something must be done beyond the fact of merely dealing with the mechanical environment of the employee. His entire environment must be dealt with.

It is hoped that every safety director will carefully study Mr. Winslow's October issue of the *News Letter*. It was an extensive treatise on accident prevention and safety methods revealing considerable study of scientific principles as applied to the handling of difficult safety problems.

Election of Officers

The Nominating Committee's report was taken up at two different periods during the sessions. The first presentation was held over for discussion of a recommendation made by the Committee that the chairs of Vice Chairman and Secretary be considered ascending chairs to the Chairmanship. Further recommendation was that the Chairman of the Program Committee be regarded as the senior committee chairman as in line of succession to the office of Secretary. Also, in the first reading of the Nominating Committee's report Arthur E. Winslow, Hollingsworth & Whitney Co., Waterville, Me., was slated for the offices of Secretary and *News Letter* Editor (which had been felt by the committee to be a desirable combination). However, Mr. Winslow felt he could not accept the office, and the final report of the committee was not presented until the closing session on Thursday morning. At that time, the question of progression of offices from the Program Committee Chairman, to Secretary, Vice President and finally to Chairmanship was discussed. The recommendation of the Nominating Committee was that this procedure not be considered as binding, but that if the lower ranking officer was capable, took an interest in the work of the Section and made the most of his contacts with sectional leaders and the National Safety Council headquarters, he should be considered the logical applicant for election to the next highest office the following year. The measure was voted upon, and carried, as was also the final slate of officers presented for acceptance.

New officers for the year 1933-1934 are:

General Chairman—H. D. Gilson, Oxford Paper Co., Rumford, Me.; *Vice Chairman in charge of Membership*—H. D. Banta, Hober Paper & Fibre Co., Green Bay, Wis.; *Secretary and News Letter Editor*—F. L. Irvin, St. Croix Paper Co., Woodland, Me.; *Chairman Program Committee*—E. E. Grant, Crystal Tissue Co., Middletown, Ohio; *Chairman Engineering Committee*—George J. Adams, International Paper Co., New York; *Chairman Statistics Committee*—Arthur Murray, Container Corp. of America, Chicago; *Chairman Poster Committee*—D. C. Hunter, Oxford-Miami Paper Co., West Carrollton, Ohio; *Chairman Health Committee*—Dr. L. H. Frechtling, The Champion Coated Paper Co., Hamilton, Ohio; *Chairman Contest Committee*—A. Scott Dowd, THE PAPER INDUSTRY, Chicago.

Members at Large—Ernest Augustus, The Mead Corporation, Chillicothe, Ohio; W. J. Brennan, Safety Engineer State of Maine, Augusta, Me.; E. R. Brown, Oregon and Columbia Basin Div. National Safety Council, Portland, Ore.; Wm. H. Brydges, Bedford Pulp & Paper Co., Big Island, Va.; Kenneth L. Faist, The Champion Coated Paper Co., Hamilton, Ohio; W. L. Gleason, Hammermill Paper Co., Erie, Pa.; John Lundrigan, International Paper Co., New York; W. J. Peacock, Northern Paper Mills, Green Bay Wis.; J. J. Pizak, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.; Samuel Pruyn, Finch-Pruyn Co., Inc., Glens Falls, N. Y.; B. D. Rogers, Bird and Son, East Walpole, Mass.; F. H. Rosebush, Nekoosa-Edwards Paper Co., Port Edwards, Wis.

Nip Hazards

At the Tuesday morning session, the first subject presented was that of Nip Hazards. This problem is one of the greatest hazards the safety director has to deal with, and it has received much study and evoked considerable discussion in former meetings of the Section.

Three divisions of the subject were covered by different speakers: Nip Hazards in (a) the Finishing Room; (b) Tissue Converting Plants; (c) Board Mills.

In Finishing Rooms

George J. Adams, general supervisor, International Paper Co., New York, spoke on "Nip Hazards in Finishing Rooms." He prefaced his remarks by stating that safety supervisors are prone to give more attention to departments where more accidents have occurred during their experience, and that lesser departments such as the finishing room are often neglected.

Mr. Adams went into considerable detail on a device worked out by his company which they call a Clear Vision Guard for Supercalender Rolls. This consists only of the original angle iron guard with slots at intervals cut with the angle in such a way as to make the nip visible to the operator at any time, and doing away with the necessity of removing the guard for any purpose other than repairs and changing rolls. The guard was described as follows: 3 in. x 3 in. x ¼ in. angle iron fastened on adjustable brackets to the frame of the stack and adjusted so that the angle is in toward the nip with a ⅜ in. clearance between the guard and each of the rolls. The clear vision feature is a series of slots cut lengthwise along the angle of the iron, 8 in. long with 3 in. solid intervals.

The speaker stated that winders on supercalenders may be guarded similar to the guarding of paper machine winders, depending on the equipment. He

referred back to the meeting of the Section a year ago, at which time several different types of these guards were discussed in the report of the Committee on Nip Hazards.

The speaker declared that the type of accident resulting from starting and stopping equipment can be prevented. If the cutter is driven by a motor, adjustments and repairs should be done only when the power is shut off. Many of the older type cutters are so arranged that they do not operate as a unit but take their power from a line shaft and are controlled by a clutch or a tight and loose pulley. On this type there should be a positive device to prevent vibration or accidental shifting of the lever from starting the machine.

In closing, Mr. Adams contended that although efficient guards are an important step in preventing accidents, it is much more important that employees be properly instructed and trained through supervision; this, of course, to be best accomplished by first training foremen how to train their operators.

Photographs of the guard for supercalender rolls referred to by Mr. Adams, and pictures of other guarding devices, were passed through the audience during the meeting.

Tissue Converting Plants

Speaking on the subject of "Nip Hazards in Tissue Converting Plants," H. D. Banta, Hoberg Paper & Fibre Co., Green Bay, Wis., placed the first responsibility for the safety of the operator upon the manufacturer of the machine. He said that first, before discussing any kind of mechanical hazards, the machine must be successfully operated, and in order to make the machine safe for the operator under successful operations, it is not only necessary to have modern guards applied, but the machine must be so designed and constructed that the proper guards will give the highest degree of safety, and at the same time not interfere with the successful operation of the machine. This accomplishment, of course, calls for a spirit of closer co-operation between the equipment manufacturer and the purchaser.

In recent years, he said, designers of special machines have become more safety conscious and as a result more intelligent co-operation may be expected from them in eliminating or minimizing hazards on converting machines. The hazards on interfolding toilet machines are much the same as on roll toilet machines, except that the tucker blades on the interfolders are an additional element which should be guarded either by position or adequate metal guards.

Mr. Banta stressed the location of guards on converting machines; they must be so located that the re-threading of the paper through the machine may be accomplished without removal. This is considered so important that machine builders on new model converting machines have designed a tucker blade which is operated from without the machine by a lever. The function of this blade is to push the paper into the inrunning nip of the feed rolls, and when in an out position, acts as a guard in front of the nip. The speaker believed the fact that there are few accidents involving the inrunning nip on converting machines is due to the careful training of the operators by the foremen and the realization of the hazard by the operator himself. Wherever possible, inrunning nips should be guarded either by position or by mechanical guards. Where mechanical guards are employed, they should be so located that they do not obscure the vision of the operator when he is watching the operation of different elements of the machine in order to locate and correct some fault, which is causing improper delivery of the product.

The speaker enumerated danger points which exist on toilet interfolders, towel interfolders, napkin folding machines and embossing machines, each of which presents certain mechanical hazards that should and must be adequately guarded if accidents are to be prevented.

The importance of unrelenting safety education was summed up by Mr. Banta at the close of his address as being a vital part of the safety program. A safety director must be a good salesman —he must sell himself and the cause of safety to his men.

Mr. Banta distributed photographs showing some of the guards that have been devised for converting machines.

In the Board Mill

R. O. Dickinson, employment manager of the Cornell Wood Products Co., Cornell, Wis., spoke on "Nip Hazards in Board Mills." Mr. Dickinson referred to the many hazards connected with the board mill, there being practically all the hazards connected with the average paper mill from the raw wood to the finished product. Some of the hazards that have presented special problems at the Cornell mill are: nips on calender stacks, rotary cutter knives, slitter knives and saws. Some of these hazards have been guarded successfully. They have not yet been able to guard their stacks, and Mr. Dickinson stated he had received some helpful ideas from Mr. Adams' remarks on their guard for supercalender stacks.

The speaker told of how a distressing accident with the rotary cutter knife broke a splendid safety record a few years ago. They had talked about guarding this knife, but any guard that could be devised always seemed to be in the way. After this accident, however, the superintendent devised a piece of sheet iron running over the full length of the knife completely enclosing the upper cutting edge so that a man could not get his hand near the nip. They have had no trouble with this guard.

Referring to their problem with saws, Mr. Dickinson said they had trouble in trying to cover the sawing edge at all times. Finally, one of the men on the safety committee devised a saw guard that works on a swivel arm which keeps the saw covered at all times. They have also put guards on their Seybold cutters.

It was stated that the greatest opposition encountered in their endeavor to guard these machines was from the production end. The superintendents stated guards slowed up their efficiency in making paper.

Mr. Dickinson said he did not believe the time will ever come when nip-hazards will not exist; he believes that after all guards are put on there will still be nip hazards. In making this statement, he turned an entirely different light upon the subject under consideration. He felt there is another guard that has been much overlooked. It is not exactly a guard, it is a state of mind. When we think of nip hazards, we are apt to think of a gear, or a knife, a saw, or a point of contact. Mr. Dickinson threw a psychological aspect on the term "nip hazard," analyzing it as something the person had failed to do, or something he had done incorrectly. He believed the solution of the nip hazard problem not so much a question of guards, as it is of building safety-mindedness into the organization from the management all down the line.

The plant at Cornell has made a remarkable record in safety work. They have been given a number of awards both in the Section contests, and in the State of Wisconsin for non-accident records, and it was, therefore, particularly interesting to note some of the facts brought out by Mr. Dickinson regarding the progress made by this plant.

In 1925, he said, they had 125 accidents in which a doctor's services were needed; 87 of these were lost-time accidents. At that time there were 375 employees. They had a safety organization, safety committees and held meetings regularly. But the president-general manager who had charge of safety work at that time, felt they were getting nowhere in eliminating accidents, and he inaugurated a new campaign founded on three principles: (1) instruction, (2) appeal, (3) discipline. They had mass meetings, picnics and other measures were used to create interest. During the following year, accidents dropped from 87 to 29, the next year they dropped to 13; the year after that they dropped to 8, and the past three years they have had no lost-time accidents.

New Lessons from Old Causes of Injury

W. J. Brennan, Safety Engineer of the State of Maine, spoke at the close of the Tuesday morning session on the subject "New Lessons Learned from Old Causes of Injury." Mr. Brennan stated that in the State of Maine the matter of disseminating information concerning accidents is considered so important that an emergency memorandum is broadcast following each accident having unusual circumstances. In the course of his duties, Mr. Brennan reviews thousands of accidents every year, and having formerly been safety director in the St. Croix Paper Co., Woodland, Me., he is exceptionally well informed as to the types of accidents that might and do occur in a paper mill.

He drew a number of lessons from accidents that had come under his observation, not only in paper mills, but accidents that have occurred in other plants and might take place in a paper mill.

One incident related had to do with the use of dynamite in blasting. A steam shovel that was being used to load trucks picked up several sticks of the dynamite. This resulted in the practice of placing special staffs with flags to mark each hole where dynamite is placed. Gasoline which is used in many ways around industrial plants causes a large number of accidents every year. The speaker urged that more care be given to dispensing gasoline from the oil house and that those handling it should give more study to its uses, methods of handling and storing. A further suggestion was that a solvent of higher flash point might be substituted for gasoline for cleaning purposes.

Mr. Brennan referred to the necessity for tearing up the floors in paper mills from time to time. This presents an extremely grave hazard if drills come in contact with high tension cables buried in the floor. In a mill where such an accident took place, there now hangs a blue print showing the location, purpose and voltages of all such buried cables.

Another distressing accident was told of an employee who was compelled to reach across a vat of boiling starch to turn off the steam valve and was badly burned when the liquid "bumped." The installation of switches and controls in convenient places or the use of thermostatic control would easily avoid accidents such as this one, which proved a fatality.

Mr. Brennan drew a lesson from an instance where in replacing a burned-out lamp in a fixture between the stack and dryer of a paper machine, a worker had his pants-cuff engaged in the nip of the calender rolls, suffering severe injuries to his foot and ankle. This electrician was hastily summoned and for want of proper ladder at the moment, used the short-cut method of climbing the stack and straddled the top roll and frame. The lesson drawn from this incident is the value of foresight. Lamps do burn out and must be replaced; the safety engineer should investigate the technique of those who do it.

Another hazard mentioned by the speaker was that of slippery floors around paper machines. There are dozens of places on the frames where operators stand to perform certain duties. It seems there are never enough step-plates and from repeated changes on the older installations, water pipes, bolt heads and the slippery surfaces of frames are utilized. One safety engineer has done a great deal in this respect and has practically eliminated slipping about his machines. Here, there and everywhere on his machines will be found non-slip metal welded to surfaces where once operators jeopardized their legs.

In another paper mill, rolls of paper were stacked in the usual fashion, towering 50 and 60 feet above the warehouse floor. Workers had to scale these paper mountains and descend as best they could, with the likelihood of some day slipping on the glossy wrappers and tobogganing to the floor. Now the men are set on top of the pile by means of an ingenious bos'n's chair with safety belt, hoisted there by means of the electric hoist that piles the paper. They return to the floor by the same method.

Mr. Brennan brought out the fact that dust explosions may easily occur in a paper mill the same as a starch plant or grain elevator. Only recently an explosion of sulphur dust partially destroyed a burner room, fatally burned a worker and closed down a plant. A spark resulting from metal on metal contact as a wheelbarrow of sulphur was replenishing the hopper was the cause of this unfortunate occurrence. Many of the Maine mills now use a non-ferrous alloy shovel for sulphur handling in bins.

The speaker brought home the fact that an exchange of accident information helps every one to profit from another's misfortunes and results in many lives being saved. A number of suggestions as to methods of handling this interchange of ideas were given by Mr. Brennan.

Managed Safety in Maintenance and Repairs

The last address delivered before the Section was given at the Thursday morning meeting by C. K. Boyer, mill manager Consolidated Water Power and Paper Co., Appleton, Wis., on the subject "Managed Safety in Maintenance and Repairs."

In placing the responsibility for the safety of men engaged in maintenance and repair work, Mr. Boyer pointed first to management. Too often this responsibility is passed along to the foreman, who is left to carry this burden without the proper guidance, inadequate tools and strict orders to keep out-of-date and poor machinery functioning properly. Management is, of course, interested in the economic results of safer practices in production and repair work, for injuries cost money. Therefore, management must include safety in its production and maintenance program. Safety is not an attachment to be fastened onto an organization, but a carefully designed built-in feature.

The speaker next brought out that the engineer should see to it that safety is incorporated into all new equipment and construction. New machinery should be designed so as to demand a minimum amount of maintenance, for all repairs that can be eliminated means less repair hazards. No machine, of course, can run perpetually without some repairs; hence, machines should be built so as to make repairs safely and economically. Some machines are so constructed that they literally have to be dismantled in order to repair one small item. Further, new machinery should be put in space where repairs can be made safely. Engineers can watch out for unsafe equipment and badly placed machinery in old installations as well. A modern enclosed speed reducer will eliminate a mess of open gears and greasy belts, saving power costs and repairs.

The purchasing agent is not so often brought into the light of safety responsibility, but Mr. Boyer emphasized the fact that in purchasing equipment and machinery, it should be the duty of the purchasing agent to give special study to the design and operation of equipment within the plant. He should seek out the hazardous places in machinery and choose equipment that is constructed so as to present the least risk. On points that he does not understand, he should keep in close touch with the safety director and the management and consult them when purchasing equipment involving a question of safety.

Men chosen for repair and maintenance work should be carefully picked and trained. They are confronted with most of the risks existing in the plant and should be instructed in the proper way to handle all equipment and chemicals; they should be men of good judgment, and should be given adequate tools to work with.

The production end of the plant came in for its share of responsibility in the opinion of Mr. Boyer. He believed that a managed safety program will see that pressure is brought to bear upon the productive end of the business. Too often the production department will want a repair job rushed too much for the safety of the men making the repairs. Repair crews should be given ample time to do the job.

Experience Exchange and Accident Bureau

After the first address at the final session on Thursday morning, Retiring Chairman J. J. Pizak called H. G. Gilson, newly elected chairman of the Section, to the platform, extended best wishes for the coming year and turned the meeting over to Chairman Gilson.

The remainder of the session was given over to a round-table discussion of experiences and important subjects: (a) Reaching the New Employees; (b) Testing, Care and Use of Rubber Protective Equipment; (c) Are We Making Most of our *News Letter?*

Ernest Augustus, The Mead Corporation, Chillicothe, Ohio, spoke of a system they have used for the past three years with new employees, which has been given a rather fair test since they have recently put on some new men and re-hired some of the old employees. When a man is hired, the employment department presents him with a card on which are listed questions and information pertinent to the safety policies of the company. The man signs his name and the date on the card and when he goes to work the timekeeping department stamps the card and sends it to the foreman with instructions that he see this man and give him all the information and answers to questions indicated on the card. These cards are filed, and while they merely have a psychological

effect, they make a distinct impression upon the worker, as he cannot say he was not told about this and that.

A somewhat similar method is used at Oxford Paper Co., Rumford, Me., as explained by Chairman Gilson. The method used is cards on which questions appear that must be filled out by the employee, whether new or transferred from one department to another. This system was started looking toward the time when it may be necessary to hire more men. So far it has worked out very successfully.

E. E. Grant, Crystal Tissue Co., Middletown, Ohio, told of a booklet "You and Your Work" by Dr. Meyers of the Frigidaire Corp., which is used by them to acquaint new employees with their work and the hazards of their job.

The testing of rubber gloves and other protective equipment is, it seems, often neglected in plants where other safety measures are regularly followed. J. J. Pizak and Chairman Gilson related instances in their experience where new rubber gloves had been tested and given way. The use of these gloves would have meant loss of life. It was brought out in the meeting that any public utility will co-operate with a plant that is not equipped to test its equipment. All new equipment should be tested before being placed in use and Mr. Pizak stated that all of the rubber equipment in their plant is tested every 30 days whether it has been used or not.

During the various sessions of the Section, the *News Letter* and its possibilities as a medium of accident experience exchange had been the subject of some discussion. The point was brought out in the Chairman's address to the Section at the opening session, and also was suggested in the presentation by Arthur Winslow of the material comprising the October issue of the *News Letter*, which he read at the opening session.

Ernest Augustus, The Mead Corporation, Chillicothe, Ohio, made the suggestion to the Section, that on all accidents reported to the National Safety Council, the contest report be accompanied by full information on each accident. Also, that such information on the unusual accidents be published from time to time in the *News Letter* without any reference to the name of the plant where the accident occurred.

Upon being asked for the number of lost time accidents that had occurred during the last contest period, A. Scott Dowd, chairman of the contest committee, stated there were 829 disabling injuries during that period; 772 of this number were in Groups A, B, C and D, the balance in Division II.

At one of the earlier sessions, Chairman Pizak had appointed a committee composed of: Ernest Augustus, chairman; H. G. Gilson, E. E. Grant and A. Scott Dowd to meet and formulate plans for the working out of this Accident Exchange. Mr. Pizak also agreed to serve with the committee *ex officio*.

At the closing session, Mr. Augustus reported that the committee had worked out a form to use in making the reports for this Accident Bureau and a copy of the form was displayed on a bulletin board in the front of the room. He made a plea for accurate and complete information on these reports. In addition to the publication of information and details on unusual accidents through the *News Letter*, Mr. Augustus will keep a complete file of all reports received, and at the close of the year this data will be put into statistical form by him and a copy sent to all members of the Section.

Exhibits

The usual fine display of safety equipment was on exhibition in the spacious Exposition Hall of the hotel. Perhaps the newest and most unique display was the line of new cut-outs originated by the National Safety Council, and exhibited in its Poster Department. Any mill can make these figures following their own original ideas. Any picture or drawing from a magazine or printed matter may be used. Simply cut the figure out, place between glass and insert in your own picture projector. For a screen, use a piece of ordinary paperboard. Trace the outlines of the figure with heavy crayon, cut it out and paint it. It can then be mounted on any simple standard and moved around from place to place. Nearly every plant has some ingenious person who can achieve some very artistic effects with these cut-outs and they will attract the attention of the employees and subconsciously drive home a safety truth.

❖ ❖ ❖

◆ Charles Piez

Charles Piez, Chairman of the Board of the Link-Belt Company, Chicago, passed away October 2 in Washington, D. C., at the age of 67 years.

Few business leaders leave behind them a list of achievements equaling those achieved by Mr. Piez. He was famous as an organizer and manager of industry, and was prominent in official circles at Washington. He had been given important government assignments on several occasions and was instrumental in framing much of the labor legislation of the State of Illinois, having been a member of the Commission that drew the State Factory Act. He was chairman of the Workmen's Compensation Commission, and a member of the State Arbitration Board. He was a director of a large number of organizations and financial institutions, and had received the honorary degree of Doctor of Commercial Science, New York University. He was also a member of a number of engineering societies.

Mr. Piez had been Chairman of the Board of Link-Belt Company since 1924, prior to which time he had served as the company's president.

He is survived by his widow.

◆ CHAS. F. NORTON, former vice-president and general manager of the Howell Electric Motors Co., has become associated with The Louis Allis Co., Milwaukee, Wis., in an exectutive sales capacity.

◆ New Catalogues and Publications

Central Foundry Company, 420 Lexington Ave., New York—A new 56-page booklet features this company's Universal Cast Iron Pipe and Fittings. This pipe is suitable for all pressures and services. The booklet contains tables giving sizes, thicknesses, and weights, also much data of interest to pipe and fitting purchasers, together with a number of illustrations.

Goulds Pumps, Inc., Seneca Falls, N. Y.—A folder, No. 204 is devoted to the Goulds Close-Coupled Motor-Centrifugal Pumping Unit. The unit is illustrated, both photographic and sectional views and the features of construction concisely explained. A rather extensive performance chart is shown in the folder, and the company welcomes any inquiries from the paper industry, in which these pumps are claimed to have many uses.

General Electric Co., Schenectady, N. Y.—Photoelectric Relays which have many applications, is the subject of a new catalogue just issued. The features of G-E Photoelectric Relays, their applications and principles of operation are subjects briefly outlined. There are illustrations of the different types, and much interesting information on the subject.

Link-Belt Co., Chicago—A 128-page Data Book has just been received covering this company's Caldwell Helicoid and Sectional-Flight Screw Conveyor. The book is well illustrated, contains engineering data and list prices, and is claimed by this company to be one of the most complete treatises ever published on the subject. Copies sent if requested on business letterhead.

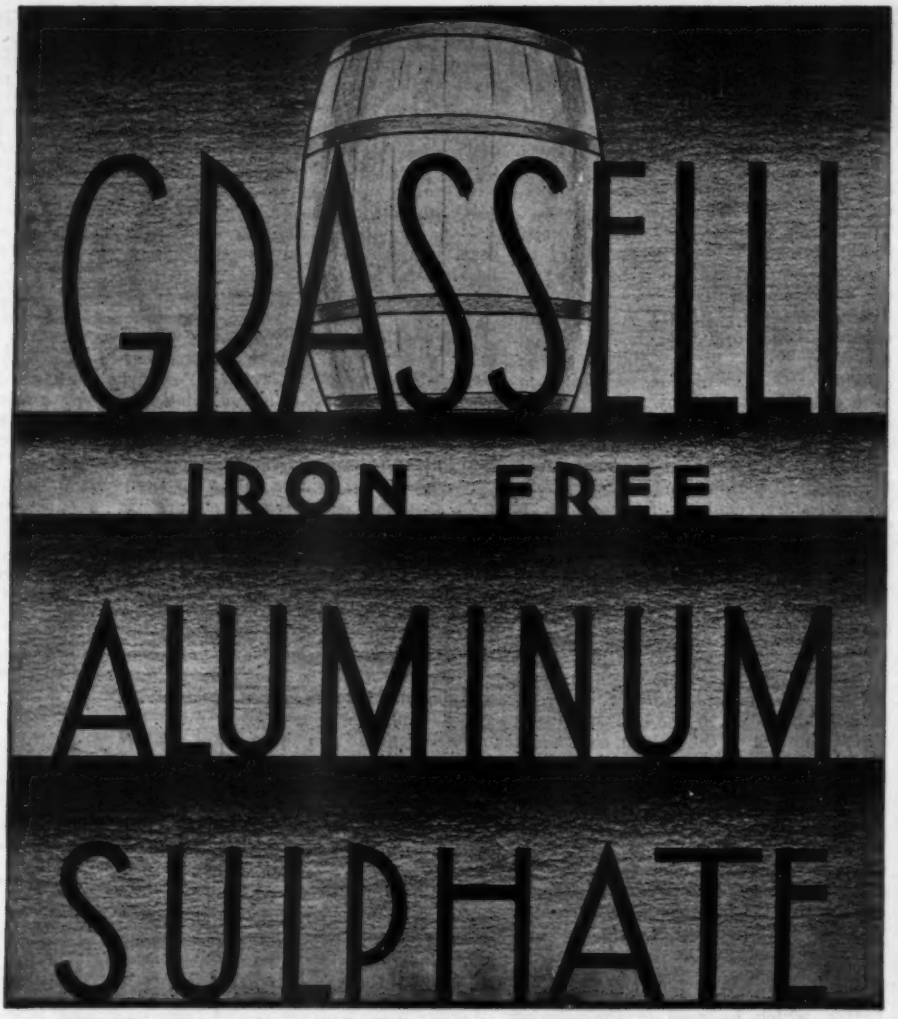
Mason-Neilan Regulator Co., 1190 Adams St., Boston—Bulletin No. 2000-c describes in detail the construction and operation of this company's line of compensated pressure control instruments. The exclusive Mason-Neilan Control Valve Compensator with which every pressure controller is equipped is fully explained. There is also a full explanation of the many other characteristic features of these instruments as well as the Parabolic Gradual Opening Ball Bearing Control Valves. Copies upon request.

Pfaltz & Bauer, Inc., 300 Pearl St., New York—This company announces that it is now ready to distribute new catalogues and literature on scientific instruments manufactured by C. Reichert, Vienna, Austria. Literature upon request.

Pure Oil Company, Chicago—"Lubrication of Bearings," a subject which is highly important in any industrial plant, is the title of this company's Mechanical Bulletin No. 57. This booklet was compiled for the purpose of promoting correct lubrication, since practical lubrication in industry centers largely around bearing lubrication. Bearing design and methods of applying lubricants are dealt with in a practical manner and in a way that should appeal to the machine user, the machine designer, engineer and the buyer of lubricants. There are chapters on: The Mechanism of Journal Bearing Lubrication, Lubrication as Related to Types of Bearings, Bearing Metals, Lubricants for Bearings, and Application of Lubricants. The text has been carefully prepared and laid out, and is amplified by a large number of illustrations.

J. O. Ross Engineering Corp., New York—This company has issued a folder covering its most recent development, the Ross Unit Air Conditioner. This equipment is in operation in the building of the General Cigar Co., at A Century of Progress, Chicago.

Schutte & Koerting Co., Philadelphia—Up-to-date information on SK Rotameters, for liquids and gases, is included in a bulletin 18-R, recently issued. The Rotameter has many applications as it is claimed to have been used successfully for measuring practically all kinds of liquids and gases. In the list of users are the names of several paper mills.



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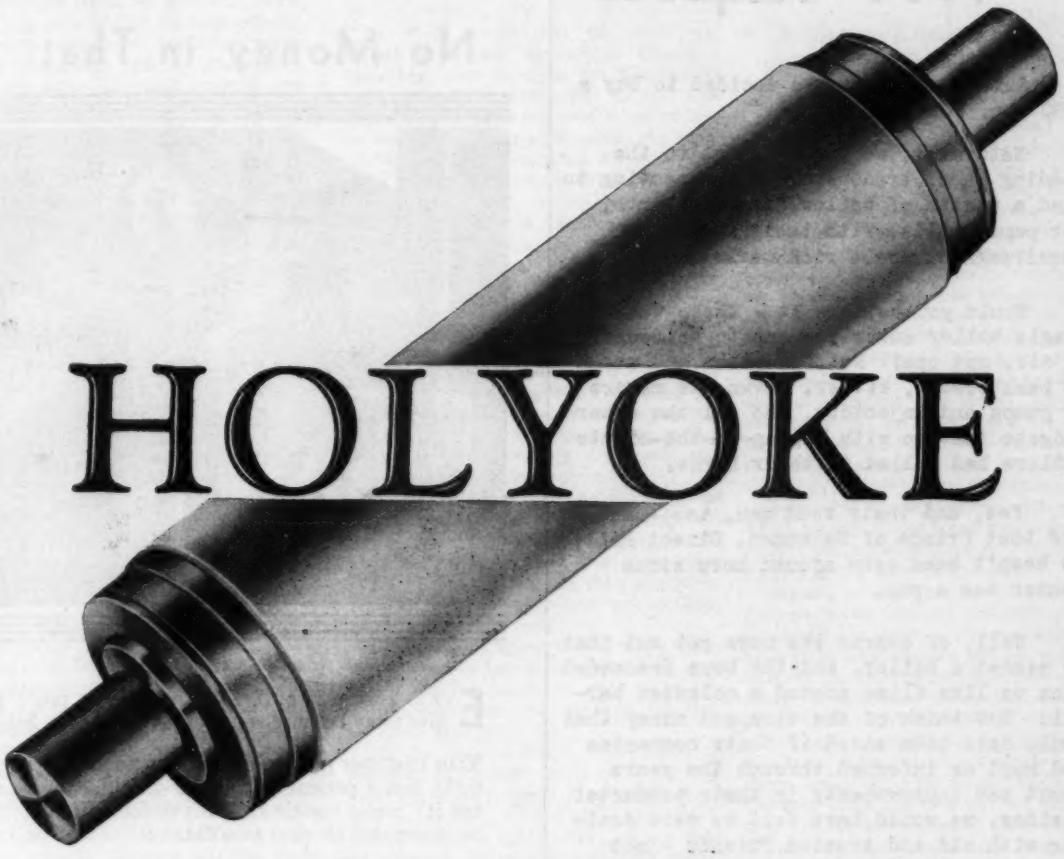

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FOUNDED 1863

Parchment, Michigan

Boilers and KVP Papers

A few weeks ago, we decided to buy a 1500 h.p. boiler.

Naturally, we turned first to the leading paper trade journals, expecting to find a wealth of boiler advertisements, for paper mills, with their huge power requirements, are a rich market.

Would you believe it - there wasn't a single boiler advertisement to be found! No sir, not one! Not for weeks and weeks of back issues, either. Even the makers of pumps and injectors, and all the other gadgets that go with big up-to-the-minute boilers had pulled in their horns.

Yes, and their road men, too - and as for that Prince of Salesmen, Direct Mail, he hasn't been seen around here since Hector was a pup.

Well, of course the news got out that we needed a boiler, and the boys descended upon us like flies around a molasses barrel. But think of the time and money that could have been saved if their companies had kept us informed through the years about new improvements in their products! Besides, we would have felt we were dealing with old and trusted Friends - not with Strangers.

It hurts to see folks with fine, outstanding products, pull in their advertising and selling horns like this. It is too much like a general with a fine big army, fully equipped and needing only the command "Forward!" to assure certain victory - calling off the battle because it sprinkled a little the night before.

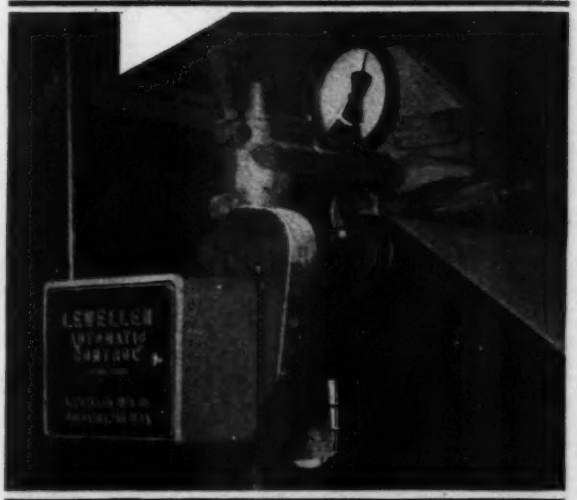
Uncle Jake

KALAMAZOO VEGETABLE PARCHMENT COMPANY

P.S. Boilers and KVP Papers - what's the tie-up? Simply this - good equipment means good paper. Every bit of equipment in this mill must be the "last word" in its line; that is a fundamental policy. That means better paper and better service. It is why we are called "The World's Model Paper Mill."

DON'T GIVE YOUR PROFIT AWAY...

No Money in That...



EVER Figure it out? Just how much profit you give away because your boards are run too heavy?

Your customer pays so much a thousand sheets—you make him a present of the over-weight. Maybe not, but it's pretty certain that, if you figure it out, you'll be astounded at what you discover.

One way to be sure you are not giving away your profit is to put in a Harvey-Lewellen Thickness Control. It *controls* the thickness—automatically by electric controls.

Harvey-Lewellen Thickness Control has demonstrated what it can do in many mills on machines trimming from 48 to 156 inches, making all grades from .006 to wall board.

No tearing out of weigh sheets—no running from one end of the machine to the other—no scrambling up to the stock box. That's all done away with.

Here is something that every board mill should know about. It just makes the Mill be fair to itself. The full story can be had for the asking. Write

THE ENTERPRISE MACHINE CO.
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POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Care of Commutators

If sparking is caused by a rough or pitted commutator, the obvious remedy is to bring the commutator back to its original smooth condition. If this roughness or pitting is moderate, the commutator may be smoothed with a sandstone or with sandpaper applied by means of a wood block. Emery cloth or paper should never be used for this purpose and even when using sandpaper, the brushes should always be raised to prevent particles of sand becoming imbedded in the brush faces.

Should the pitting or roughness of the commutator be so serious that surfacing in the manner described proves ineffective, the commutator should be turned down, either by mounting the armature in a lathe or by means of a tool rest attachment, usually provided with large machines.

The sparking difficulty due to a loose commutator bar may often be corrected by tightening up the clamp ring which holds the segments in place and then smoothing off with a stone.

Pitted mica is a term applied to a serious type of commutator trouble usually encountered in cases where the commutator has become oil soaked, due to leaking or overfull bearings.

Mica readily absorbs oil. If, therefore, oil remains upon the surface of the commutator for any length of time, a certain amount of this oil will soak into the mica segments between the bars. This will result in arcing and ring fire, causing the mica to be burned away and leaving carbonized paths sometimes two or three inches in depth. If this condition is noticed in its early stages, before the pitting has reached a depth of, say one-half inch, the commutator may be temporarily repaired by patching or filling. This may be done as follows: Cut away all of the carbonized mica carefully and remove all burnt particles with a knife or a thin hack saw blade. After having thoroughly cleaned the holes in this manner, fill them with a good commutator cement of which there are many upon the market. If none can be secured, however, a good filling paste may be made up as follows: Two parts plaster of Paris; one part powdered mica; and enough glue to make a thick paste. This, when applied, will dry quickly and when kept free from oil will hold for a year or longer.

It often occurs that the mica segments have been burned by excessive sparking, such burning not necessarily having been superinduced by oil, and that the pitting is confined more or less to the surface. In such cases, the trouble is readily eliminated by undercutting. This procedure, which is the same as that used to relieve the trouble known as high mica, consists in slightly grooving the mica below the surface of the commutator.

The depth to which the insulation may be grooved depends upon the thickness of the mica and the voltage normally existing between adjacent bars. For usual thicknesses and with the voltage between segments ranging between 10 and 18 v., undercutting should not exceed $\frac{1}{32}$ in. It may be done with a hack saw or preferably with tools specially made for the purpose.

Armature coils are liable to three main types of faults, namely, short circuits, open circuits and grounds. In the new-armature or one just rewound, there may also exist, in rare instances, trouble due to improper connections, such as reversed coils.

Repairing of these faults, after their exact location has been ascertained may be simple, but often, on account of the cramped quarters for working, the task is quite difficult.

In the case of short circuit, the offending conductors must be separated and the faulty spots taped, silk tape being employed where space is limited. Occasionally, a satisfactory repair may be effected by merely inserting pieces of mica between the conductors and then tying them together with tape or cord.

An open circuit is more or less difficult of repair depending upon the nature and location of the fault. If the wires are merely loose from the commutator necks, or are broken off in an accessible position, the remedy is readily applied. A small sleeve soldered on will make a neat and lasting splice, although sometimes it is easier to make a common twisted joint.

◆ A GOVERNOR is said to be stable when it assumes a definite position for each particular speed and when a change of speed is necessary for a change of position, while a governor which is in equilibrium at but one speed is said to be isochronous. Perfect isochronism would be impractical as the slightest increase in speed above the normal would result in cutting off the steam, accompanied by a sudden decrease of speed, following which the steam valve would open wide, thus giving rise to extreme fluctuations.

◆ Armature Repairs

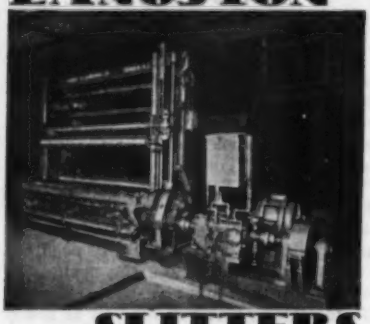
Under certain conditions, it is necessary to make a splice in a portion of a conductor lying in a slot. To do this properly, first remove the band wires and slot sticks and raise the conductors out of the slot containing the damaged wire. If it is a bottom coil that is damaged, it will be necessary to raise enough upper coils to free the faulty side. Care in doing this may save hours of needless work afterwards. When the open ends are located, they must be separated from the remaining turns of the coil as much as possible without damaging the insulation. The ends are then flattened into a wedge shape by being hammered against a smooth iron block. After the conductor is flattened out, the extra width is trimmed off. The ends are now tinned and soldered. The joint is completed by winding with fine wire and by sweating the whole together with solder. After taping, if the work has been carefully done, there will be no difficulty in replacing the coils in the slot.

Repairs to the armature core are difficult to make without dismantling the machine; for while sometimes apparently satisfactory repairs can be made by driving the lamination into line and by filing, it is almost impossible to avoid short circuiting laminations which will allow eddy currents to flow and cause heating. Armature laminations are at times badly distorted by rubbing against the field poles due to a burned out bearing. It is then essential that the iron be put into good condition before any attempt is made to replace the repaired coils. In any considerable number of laminations have been burned together, due to a ground, it is advisable to strip off the winding and to restack the iron, distributing the burned laminations throughout the armature.

Before assembling new laminations, they must be treated with a good core plate varnish. This may be done by hand or by dipping. A machine for performing this operation consists of two printer's rollers, placed one above the other, the lower dipping into a trough-like pan containing the varnish. The lower roll transfers the varnish to the upper and the disks are fed between the rolls.

◆ THE SAFETY-VALVE capacity on a boiler should be such that the valve or valves will discharge all the steam that can be generated by the boiler without allowing the pressure to increase more than 6 per cent above the maximum working pressure or more than 6 per cent above the highest pressure to which any valve is set.

LANGSTON



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One way in which many plants are taking care of this important work is to have BRISTOL'S "Periodic Instrument Inspection Service," accessibly located in strategic centers throughout the country, make "Periodic Inspections" and examinations on a predetermined schedule. These plants are playing safe against future emergencies and trouble.

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Request will bring specific suggestions suitable to your needs.

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***By* Harry Williamson**

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A 48-page pamphlet made up of practical helps, many of which have meant considerable savings in paper and pulp mills. Of tremendous value to the practical man. Price 50c.

THE PAPER INDUSTRY

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◆ Increase in Forest Land Recommended

A substantial increase in the public ownership of forest land is urged in the recent Copeland Forestry Report which is the most complete survey of forest land conditions yet made in the United States. This report was submitted to the last session of Congress under the title "A National Plan for American Forestry." Larger public ownership of forest land in the United States is in keeping with the policies adopted by many foreign nations after years of forest devastation due to lack of government control of this important natural resource, says the New York State College of Forestry, Syracuse University.

Generally, the Copeland Report recommends a large extension of public ownership and more intensive management of publicly owned forest lands. Among the items which stand out in the report in relation to this matter are:

"Ninety per cent of devastated and poorly stocked forest land and 95 per cent of current devastation is on privately owned lands. 99 per cent of cutting without regard to reproduction and 98 per cent of burned over area annually is on private lands. Private ownership is responsible for practically all critical watershed problems of the East and a substantial part of those of the West. Public aid to private owners is more than twice the expenditures of private owners on their own lands. 98 per cent of the area burned annually is in private ownership. A great new public domain is being created before the problem of the existing public domain has been solved. Less than 5 per cent of privately owned forest land is cut for renewal. The area of land planted by public agencies is twice that planted by private ownership."

Public forest ownership has been gaining ground through the difficult financial situation in which private owners of extensive timber tracts find themselves and there probably never was a time like the present when a large extension of public ownership of forest lands seemed so reasonable and necessary, says the College of Forestry.

◆ Superheater Acquires Management and Sales of Air Preheater Corp.

As of September 12, 1933, The Superheater Company, New York, acquired an interest in and assumed the management of The Air Preheater Corporation, Wellsville, N. Y., manufacturers of Ljungstrom air preheaters. The Air Preheater Corporation retains its corporate identity under new management, and will continue the manufacture of its products at its Wellsville plant. H. S. Colby will remain in the organization as vice-president. Its executive offices will be consolidated with those of The Superheater Company at 60 East 42nd Street, New York. Air Preheater sales activities will be coordinated with the Industrial Department of The Superheater Company, with headquarters at that address, and of which William T. Conlon has lately been made manager.

The new officers of The Air Preheater Corporation are as follows: F. A. Schaff, president; H. S. Colby, vice-president; M. Schiller, vice-president and treasurer; T. F. Morris, secretary and assistant treasurer; H. S. Marshall, assistant secretary and assistant treasurer. The directors are George Bourne, chairman; W. L. Batt, H. S. Colby, R. M. Gates, F. A. Schaff and M. Schiller.

◆ Sulphur in Turpentine Cups Contaminates Finished Products

The Bureau of Chemistry and Soils has tested several types of paper turpentine cups which had been impregnated with sulphur to make them water-resistant and firm. Tests showed that the gum dissolves some of the sulphur and that both the resulting rosin and turpentine are contaminated thereby. The rosin especially contains sufficient sulphur and sulphur compounds to rapidly blacken a copper immersed in the melted rosin and both the rosin and turpentine are given decidedly different odors from what they naturally have. Sulphur may be removed from turpentine by alkali treatment and subsequent washing. No feasible method is yet known for removing sulphur from rosin.

The bureau, therefore, says that it cannot recommend to producers the use of cups containing sulphur or sulphur compounds.

Need it in a hurry?

HERE'S another advantage in using ARMCO SPIRAL WELDED PIPE. You can get it when you want it, delivered to your mill in just the right sizes and lengths and with the proper coating and fittings. No costly delays, no waiting and fuming—delivery on the dot. ARMCO PIPE is your very own idea as to what efficient paper-mill pipe should be. It is trim and strong, free from burdensome weight, and sheer-smooth inside. It goes in quickly, cuts piping costs to the marrow, and speeds up production. Order ARMCO SPIRAL WELDED PIPE from our ample stocks in any quantity you require, small or large. Just 'phone, wire or write.

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Small space occupied, any capacity, low over-all operating costs, high and extreme efficiencies, reliability, low initial investment. Complete power plants to meet any operating conditions of Pulp and Paper mills or other industrial service. Engineering and Construction.

Satisfactory Services Always Guaranteed.

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Monadnock Bldg., Chicago

BLEACH TANK WHITE

Formerly known as DAIRY WHITE.

BLEACH TANK WHITE will actually protect metals from corrosion and make unnecessary the immediate replacement of metal parts which may be causing poor quality pulp. Acid and alkali proof.

Dries by evaporation in a few minutes, can be applied over damp surfaces and becomes very glossy when dry.

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PAPER

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The Paper Industry Safety Contest

August Scores—31 Mills Report "Perfect"

Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A	Hollingsworth & Whitney Co.	Algonquin & Taconnet	Winslow, Me.
	International Paper Co	Otis	Chisholm, Me.
	The Champion Coated Paper Co.	No. 2	Hamilton, Ohio
GROUP B	Kimberly-Clark Corp.	Badger-Globe	Neenah, Wis.
	Kimberly-Clark Corp.	Niagara	Wisconsin
	St. Croix Paper Co.	Woodland	Maine
GROUP C	Escanaba Paper Co.	Escanaba	Michigan
	Bryant Paper Co.	Paper Div.	Kalamazoo, Mich.
	Container Corp. of America	Coated Board Div.	Chicago, Ill.
	Bird & Son, Inc.	Norwood	Massachusetts
	Consolidated Water Power & Paper Co.	Appleton	Wisconsin
GROUP D	Southern Extract Co.	Chillicothe	Ohio
	International Paper Co.	Webster	Orono, Me.
	The Upson Company	Lockport	New York
	Hollingsworth & Whitney Co.	Arcostook & Cobbossee	Gardiner, Me.
	International Paper Co.	Continental Div.	Ashland, N. H.
	Bird & Son, Inc.	Phillipsdale	Rhode Island
	Bird & Son, Inc.	Chicago Roofing Plant	Chicago
	International Paper Co.	Livermore Falls	Maine
	Hollingsworth & Whitney Co.	Abenaquis Mill	Madison, Me.
	International Paper Co.	Riley	Maine
	Spaulding Fibre Co., Inc.	New Mill	Milton, N. H.
	Spaulding Fibre Co., Inc.	Hayes	Rochester, N. H.

Division II—Remanufacturing

	Bryant Paper Co.	Imperial Div.	Kalamazoo, Mich.
	Individual Drinking Cup Co., Inc.	Easton	Pennsylvania
	Gardner-Richardson Co.	No. 4	Middletown, Ohio
	Container Corp. of America	Anderson	Indiana
	Container Corp. of America	Natick	Massachusetts
	Texas Corrugated Box Co.	Dallas	Texas
	Southern Container Co.	Houston	Texas
	Bemis Bro. Bag Co.	East Pepperell	Massachusetts

IMPERFECT SCORES—Division I

	Key	Rank	Points Credit	Points Debit
GROUP A	PB- 9	4	863.088	
	PA- 8	5	796.738	
	PA- 3	6	737.166	
	PB- 5	7	737.003	
	PB-15	8	694.232	
	PA- 1	9	676.170	
	PA-11	10	615.056	
	PA- 5	11	582.046	
	PA- 4	12	450.150	
	PA-16	13	418.078	
	PA-14	14	185.530	
	PA-12	15	140.736	
	PA-15	16		29.438
	PB- 2	17		112.514
	PA-13	18		476.616
	PA- 7	19		481.638
	PA- 9	20		694.246
GROUP B	PB-11	4	831.400	
	PC-10	5	773.704	
	PB-12	6	667.568	
	PB- 3	7	637.450	
	PB- 1	8	598.064	
	PB-17	9	555.240	
	PB-16	10	437.950	
	PC-18	11	200.726	
	PB-13	12	55.654	
	PC- 7	13		88.166
	PC- 2	14		108.508
	PB- 4	15		602.118

Division II

RA- 1	9	927.066	
RC- 2	10	757.390	
RC- 5	11	649.922	
RD- 4	12		111.104
RD- 7	13		712.060
RD- 6	14		1,005.856

	Key	Rank	Points Credit	Points Debit
GROUP C	PC- 3	6	639.170	
	PC-15	7	577.374	
	PD-28	8	576.320	
	PC-20	9	499.072	
	PD-25	10	334.194	
	PC-21	11	287.490	
	PD-13	12	217.778	
	PB-10	13	106.192	
	PC- 8	14	82.040	
	PD-17	15	63.136	
	PC-19	16		197.782
	PC-12	17		241.392
	PC-16	18		273.430
	PC- 4	19		665.440
	PC-26	20		1,144.542
	PB-18	21		2,224.360
	PD- 2	22		6,832.710
GROUP D	PD-12	13	334.176	
	PD-20	14	263.266	
	PD-26	15	256.714	
	PD- 1	16		121.728
	PD- 7	17		605.006
	PD-11	18		698.038
	PD- 8	19		1,125.686
	PD-14	20		1,180.384
	PD-29	21		3,445.456

No July Report: PB-14, PC-17, 21, 22, 23, RC-3.

No August Report: PB-8, 14, PC-5, 13, 14, 17, 21, 22, 23, RC-3.

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Shaf-tite Rolls are positively the lowest-priced quality rolls on the market. Mass production methods—Rodney Hunt is the world's largest roll maker—permit many savings that cannot be made by the other roll builders.

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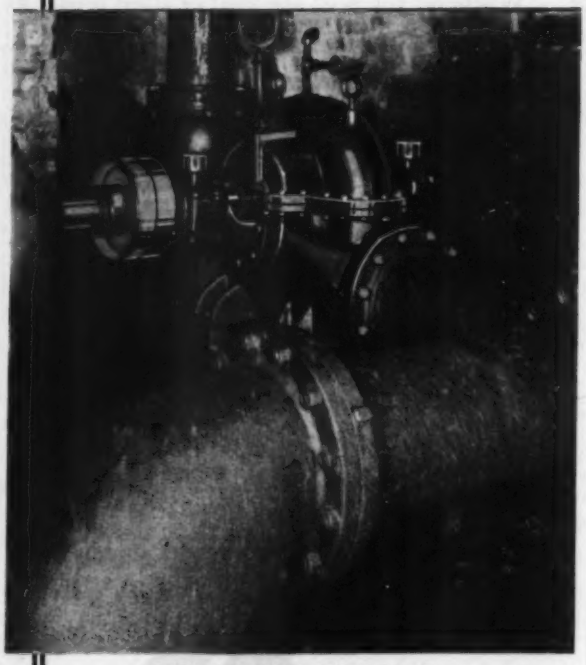
In places where Failure is Fatal



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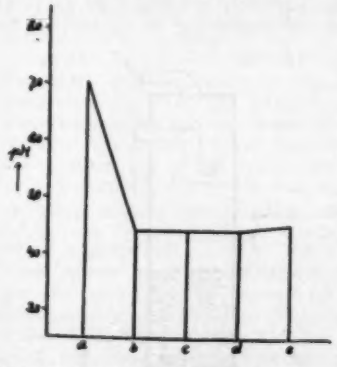
TECHNICAL DEVELOPMENTS

IN THE PAPER INDUSTRY ■ DOMESTIC AND FOREIGN

The following abstracts are of the latest developments found in the foreign press and in the patent offices. Photostats and translations of complete articles and patents can be obtained at cost price.

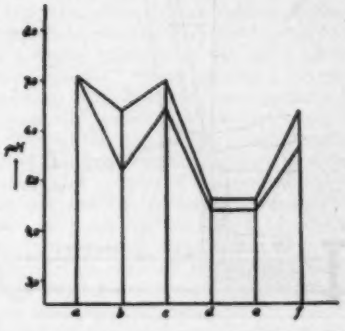
◆ Theory of Rosin Sizing

A scientific basis is sought for the old and new theories of sizing paper. The various technical factors influencing sizing are also discussed. Special attention is given to the large variations in the pH in completely saponified rosin size in comparison with the small variations when a size containing 45 per cent. free rosin is used. In the case of completely saponified rosin size not only are there large variations in pH during the course of the sizing process in the beater, but the course of variation of pH varies also from beater to beater. The variation in the pH number is shown in Figure 1. The point (a) represents the pH before the size is introduced into the beater and is equal to 7.1. The point (b) is the pH (equal to 4.4) after the alum has been added; the point (c) the pH (scarcely different, also 4.4) after the rosin milk has been added; the point (d) the pH (also equal to 4.4) after the addition of china clay, starch, animal glue and tamol at the time the beater is discharged; the point (e) the pH (equal to 4.5) of the stock on the paper machine. In the case of Figure 2, point (a) shows the pH (equal to 7.1) at the end of beating; point (b) the pH



(5.3 to 6.4) after addition of sulphuric acid; point (c) the pH (equal to 6.5 to 7.0) after the addition of Delthirna size; point (d) the pH (equal to 4.4 to 4.6) after the addition of alum; point (e) the pH (equal to 4.4 to 4.6) after the addition of china clay, starch, etc., on discharging the contents of the beater; point (f) the pH of the stock on the paper machine, equal to 5.7 to 6.4.

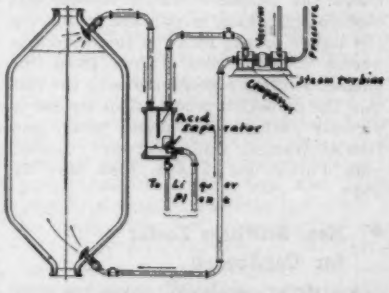
A study was also made of the effect of various operating factors on the sizing process. As far as the water used is concerned, particular attention is paid to the action of hardness salts in causing agglomeration of the particles of the size, which are partially chemically coagulated and partially precipitated as magnesium resinate and calcium resinate. Size, containing free rosin, is somewhate more stable to hardness salts than completely saponified rosin size. A high content of carbon dioxide in the water leads to formation of soda in sizes of high pH, and thereafter to the formation of a calcium carbonate slime on the paper fibers which impairs the sizing quality of the paper causing the ink to run. Too soft water is also disadvan-



tageous. Alumina content of the alum and the quantity of alum used are also important factors. The allowable pH varies in the weekly acid range from about 4 to 6. Stable, well-sized paper with pH below 3.8 does not exist in the experience of the author and such paper loses its sizing quality within a short time, because sufficient alumina is lacking in the paper and the isoelectric status is not formed. The great range of variation of the best pH coefficient of sized paper is connected with the changeability of the isoelectric point of the fibers. The isoelectric point of a pulp varies on the pH scale according to the properties of the wood and also according to the digestion process used in making the pulp. Considerable time is spent in this article in discussing the exact definition of the isoelectric point. Attention is called in conclusion to the fact that too strong calendering of the paper can destroy the rosin structure and injure its sizing quality. Dr. Rudolf Lorenz. Der Papier-Fabrikant, 1933, volume 31, pages 179 to 187. (F-2 illus.)

◆ New Liquor Circulation System

This system was described in an article on the Swedish paper industry during 1932. The apparatus is shown in the accompanying illustration. It is used on sulphite digesters. It works on the principle of returning the sulphur dioxide gases, which are evolved during the rise of temperature of the digestion liquor, to the latter. The system can be used for direct and indirect sulphite digestion. Circulation of the sulphur dioxide gas is accomplished by the compressor and the acid separator. The compressor is made of special, acid-resistant material and is constructed in such a manner, that a strong circulation of gas is brought about. The compressor and the acid tank are connected with the digester. The gas in the upper part of the digester is conducted through the acid separator, where the acid carried along by the gas is separated and removed, for example to the liquor preparation plant. The gas, which is evolved by the acid, then passes to the compressor, which is driven by means of an electric motor or steam engine with variable speed. In the compressor the gas attains the required pressure and is forced into the lower part of the digester. Due to the variable speed of the compressor it is possible to utilize the circulation effectively. In this process of circulating the liquor and gas in the digester, uniform temperature is attained in both the upper and lower part of the same and a very uniformly digested pulp is obtained. The iodine number (the strength of the digestion acid) is reduced very slowly, because the digestion liquor is constantly enriched with sulphur dioxide, which the acid releases at rising temperature. In this manner the concentration of the digestion acid is maintained

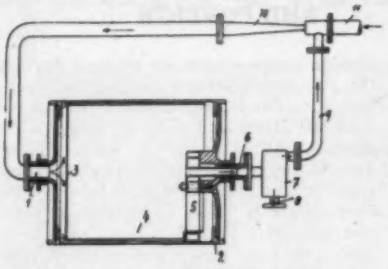


comparatively constant, until disintegration of the wood begins. The time of digestion is thereby reduced. E. Ernstler. Der Papier-Fabrikant, 1933, volume 31, pages 117 to 124.

◆ Drying Cylinder

The purpose of the improved drying cylinder with steam-heated double jacket is to secure constant contact of the entire inner surface of the external cylinder shell with the steam. Thus efficient heating is obtained. As may be seen in the accompanying illustration, the heating steam enters the cylinder (2)

through the hollow shaft (1). The steam contacts with the side surfaces (3) which form a baffle and thus the flow of steam is directed radially and passes through the annular space between the external cylinder (2) and the inner cylinder (4), the flow of steam being



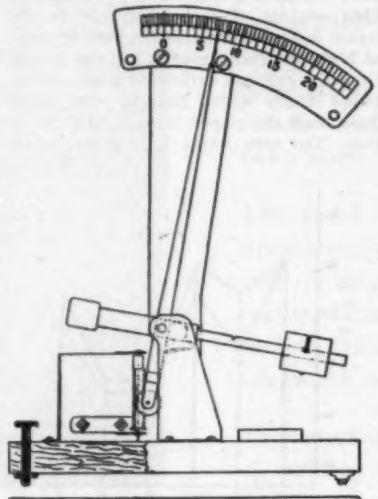
parallel to the axis of the cylinder. At the opposite end of the cylinder (2) the condensate and a part of the non-condensed steam which enters at (1) passes through the device (5) on the hollow shaft and reaches the space (7), wherein the water and steam are separated. The condensate is removed through the connection (8) and the steam is led through the pipe (9) upwards through the spray apparatus (10). Fresh steam is admitted through (11) and this serves to carry the recovered steam along with it to the hollow shaft (1) into the cylinder (2). German Patent No. 569,099. Dr. Paul H. Mueller, Hannover, Germany.

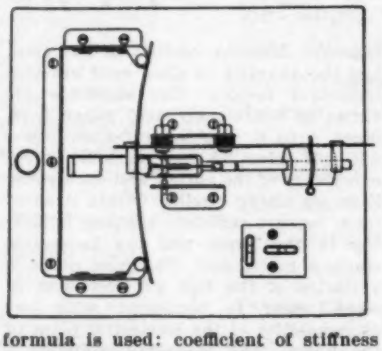
◆ Making Pulp

The wood is subjected to preliminary treatment before digestion for the purpose of obtaining increased yield and shortened digestion period. The raw material is accordingly impregnated in the moist condition with gaseous sulphur dioxide and then treated with the digestion liquor (calcium bisulphite liquor) at low temperatures, below 70 degrees C., and at pressures several times the pressure which corresponds thereto and which is obtained by forcing the liquor or gas into the impregnating vessel. The proces differs from the earlier, similar processes due to the fact that the digestion process does not set in directly after treatment with gas. Daniel Westad, Oslo, Norway. Norwegian Patent No. 51,668, filed May 27, 1930.

◆ New Stiffness Tester for Cardboard

A strip of cardboard, three cm. wide and 12 cm. long, rests freely over vertical rollers, separated from one another by a distance of 10 cm. The cardboard sample is held on the vertical rollers by a gentle pressure (corresponding to a load of only 0.3 gram), this being exerted by means of a small roller fastened to the short end of a pressure lever. The long end of the lever is extended to form a pointer, which moves over a scale, and indicates the number of millimeters the middle of the strip of cardboard has been pushed out by the pressure exerted against it. The load is exerted by means of a wedged lever, arranged on the axis of the pressure lever, but independent thereof, and provided with two grooves. The arrangement allows a pressure of 3 to 200 grams to be exerted against the sample being tested. The instrument is prepared for the test by placing sufficient weights on the weight arm to bring the pointer to the zero mark on the scale. The sample is placed in position and the weight arm lowered until the pressure roller lies against the sample. The deflection in the pointer is read and the operation is repeated until the pointer deflection is not increased. To calculate the coefficient of stiffness for a strip of cardboard 10 mm. wide, the following





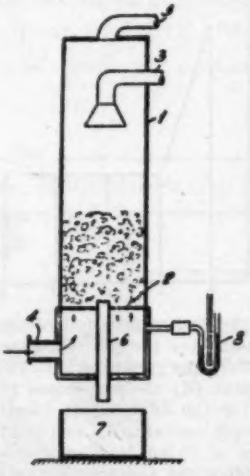
formula is used: coefficient of stiffness equals 666.7 divided by the production of bending times weight times position of the weight arm. Zellstoff und Papier, 1933, volume 13, pages 158 to 159.

◆ Water Requirements in Paper Mills

The great difference in the requirements for fresh water in the paper mill is discussed. Advantages are cited for curtailing the consumption of water as far as possible, especially with respect to reduction of fiber values. The manner in which the water is fed to the various machines consuming it and the consumption of water entailed thereby is also discussed. A series of water diagrams are given, each system differing from the others in essential details. Reuse of the back water is a feature. Dangers and disadvantages of reducing the consumption of fresh water too far are also described. Dr. W. Brecht. Der Papier-Fabrikant, 1933, volume 31, pages 149 to 166.

◆ Evaporating Waste Liquors

The apparatus is specially suited for the evaporation of strong foaming liquors. It brings about intimate contact between a gas and the liquid, the gas being driven through a layer of liquid on a screened bottom. The evaporator has a cylindrical shape, as may be seen at (1) and the black liquor, sulphite waste liquor or the like is fed to the apparatus through the inlet pipe (3). The gas is allowed to enter through the pipe (4) at the bottom and escapes in saturated condition through the outlet at the top of the apparatus at (5). The concentrated black liquor or the like is discharged from the evaporator through the pipe (6) into a tank (7) located externally of the same. The manometer (8) is used for the purpose of measuring pressure drop. In order to obtain the greatest possible effectiveness of evaporation with a definite area of bottom, it is desirable that each square meter of the bottom should produce the greatest possible gaseous volume without the pressure drop being too great. This is attained in part by making the free surface per square meter bottom surface as large as possible, and in part by making the holes as large as possible, or in case slots are used making their width as great as possible. However, the area of each hole must not be too large, since under such conditions equilibrium between the gas and liquid cannot be attained. Experiment has shown that in order to obtain good results it is not feasible to make the diameter of the holes less than one mm., corresponding to about 0.8 square mm. area, advisedly not less than 2.5 to 3.0 mm., corresponding to an area of five



to seven square millimeters. The width of the slots should not be less than 0.75 mm. and best not less than 1.5 to two mm. Industrikemiscka Aktiebolaget, Stockholm, Sweden. German Patent No. 569,474.

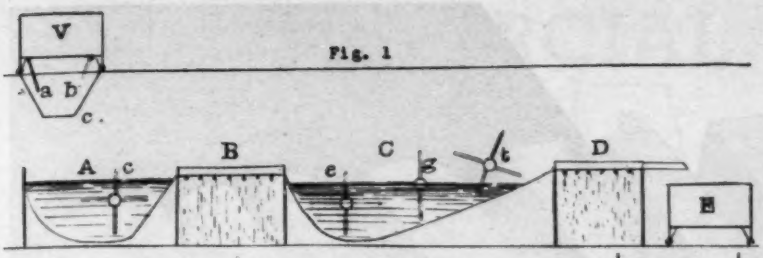


Fig. 1

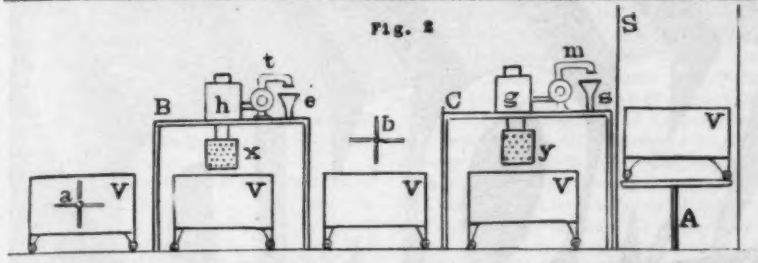


Fig. 2

◆ Dyeing Pulp in Several Colors

In the first part of the installation, shown in figure 1, the pulp arrives in a small truck (V) which is run along rails above the apparatus and which has a bottom, that can be dropped as shown in (a) and (b), the pulp falling through a hopper arrangement (c) into the first vat (A) which is filled with cold water and provided with an agitator. Then the pulp goes to the drain board (B) where considerable of the water drips off and thence into another bath (C) containing a large volume of water and provided with the agitators (e), (g) and (t). There all traces of alkali or acid are removed and the pulp passes to the drain board (D), under which is arranged the truck (E) into which the drained pulp falls. The pulp is shown in the second part of the installation, (see Figure 2) in the truck (V) which is pushed under the platform (B). It will be noticed that the truck (V) is provided with an agitator (a). The device (x) is lowered into the truck. This part (x) is connected with the mechanism (h) and the pump (t) is started operating and the water in the truck is drawn out. Then the device (x) is lifted out of the truck and the latter is sent to the next position, where the sizing composition is added, while the agitator is lowered again to mix the sizing solution and the pulp. Then the truck passes under the platform (C) and the device (y) is lowered into it automatically and the pulp is agitated while being aspirated. Finally the truck is placed on the elevator (S). This arrangement is claimed to give economical results where the pulp is mixed with various coloring matters to produce different colored paper. R. Sansone. La Papeterie, 1933, pages 412 to 414.

◆ Sulphite Pulping

Special consideration was paid in this research to the viscosity properties of the pulp. Digestion of the wood chips (picea ajanensis) was carried out under different cooking conditions and showed that the viscosity of the pulp remained very high until the digestion liquor began to darken. Then the viscosity changed rapidly. Under definite digestion conditions the viscosity of the pulp bears a definite relation to the color of the waste liquor. There is also a relationship at each digestion temperature between the viscosity of the pulp and the acidity of the liquor, which is determined after the free sulphur dioxide has been eliminated. Toward the end of the digestion the rate of decrease of viscosity and of solubility of lignin is affected by the digestion conditions. However, the relation between the viscosity of the pulp and the chlorine consumption is not markedly affected. Until the viscosity of the pulp has decreased to a large extent, the copper number and the alpha-cellulose content of the pulp are practically unchanged, but finally show degradation rapidly. As the viscosity of the pulp decreases, its solubility in hot one per cent. sodium hydroxide solution increases. H. Okada, E. Hayakawa and Z. Umeda. Journal of the Society of Chemical Industry of Japan, volume 36, 1933, pages 219 to 220.

◆ Determination of Alpha-Cellulose

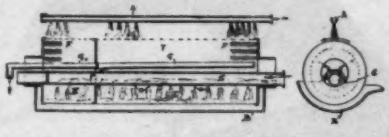
Some factors that affect the determination of alpha-cellulose in pulp are discussed. Atmospheric carbon dioxide has no effect, nor has atmospheric oxygen during the treatment of the pulp with sodium hydroxide, but degradation which occurs when the original material or the alpha-cellulose obtained from it is dried at about 100 degrees C. is due mainly to oxygen, and not to the chemical impurities present in the former. Artificial ageing tests in air as an indication of the permanence of paper are misleading. A. Y. Swamy and F. W. Bailey. Papermaker, 1933, volume 95 TS, pages 119 to 125.

◆ Durability of Sulphite Pulp

The author discusses two theories for the formation of paper. According to the fibrille theory the swelling of cellulose is caused by the separation of fibrillae from the threads. On the other hand, according to the colloidal or sizing theory, the swelling and adhesive properties of the fibers are of the greatest significance in papermaking and the separation of the fibrillae of secondary importance. Samples of sulphite pulp were tested at various intervals in the course of manufacture. The crudest pulp was found to give the greatest degree of swelling. It was also most easily ground and made the strongest paper. Samples containing various percentages of moisture were examined. Dry pulp did not swell and gives a heavy paper. A partially moistened sample of pulp gave a stronger paper than that obtained by the direction digestion of pulp. A sample was heated with strong alkali containing lime and gave a highly swelled pulp which yielded a solid strong paper. Hence it follows that the strength of a paper is not dependent solely on the length of the fibers but also on the degree of swelling of the pulp. H. Roschier, Finnish Paper and Timber Jor., 1933, 270-5.

◆ Recovering Fibers From Screens

The accompanying illustration shows an apparatus which can be used for the recovery of fine fibers from screens. Thus the fine fibers, which lie across the slots, are immediately made available. This is useful in recovering fine fibers from stock purifiers and screens, which do not pass through along with the



spray water and the knots. The knot catcher cylinder, which is provided with the slots (F), rotates in the box (B), this cylinder being shaken by a cam. The knot catcher drum is separated into two chambers (I) and (II) by means of a partition. The larger chamber (I) works in the usual manner and the spray water, containing stock, is led through outlets in the channel (G) into the smaller chamber (II), which purifies the stock just like the chamber (I) and consequently recovers fine fibers. The knot catcher receives the stock to be purified through the perforated pipe (C). The knot catcher can be divided into several compartments and the width of the slots (F) can be varied. (Thirty et Cie., Huy, Belgium. French Patent No. 737,811, filed May 30, 1932.

◆ Sulphite Pulp

The digestion acid, which has been in contact with the wood chips in a digester at the ordinary temperature and which is then heated, is discharged into a pressure tank. Thence it is charged into another digester, filled with wood and fresh liquor. Heat exchange takes place in the pressure tank. Digestion then proceeds in the usual manner. C. A. Gejer, Skoghall, Sweden. Swedish Patent No. 74,897, filed August 22, 1927.

Whether you use DIAMOND Brand by the bag, barrel or carload . . . you can always depend on its uniform chemical reaction. That is why DIAMOND 58% SODA ASH or 76% CAUSTIC SODA is not merely a numerical expression but a positive guarantee of full strength and sustained purity. There's a Diamond distributor near you.

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The COMMERCIAL OUTLOOK

New York, October 2, 1933.

ENCOURAGING indeed is the progress thus far made by industry under the NRA program. The New Deal has now been operative long enough to provide statistics which show that employment and payrolls are increasing at a most gratifying pace, with a resultant broadening of buying power of the country. Figures compiled by the national Government in Washington and by statistical agencies show a marked gain in employment as well as a big rise in remuneration paid to employes of industry.

A particularly encouraging feature of the present situation is that the increasing purchasing power brought into being by the larger payrolls and the more optimistic sentiment of the last few months has begun to assert itself in retail markets. As stated by the economist of one of the leading banking institutions of the nation, "this is a development that not only spells real and immediate relief to millions of individuals but represents a broad economic influence of the most constructive sort."

There is no question that during the last couple of months some slowing down of manufacturing activity and general business has been recorded. This has been attributed by many to the season of the year, and also to a natural reaction following the sharp spurt in production and business which began soon after the new Washington Administration took hold of the nation's affairs and which reached its peak in mid-summer. This reaction is regarded in nearly all authoritative quarters as a healthy sign—as a wholesome development from the long-term standpoint—since it means that manufacturers, jobbers and retailers are proceeding cautiously and slowly in expanding their activities. Despite the business recession, it is doubted whether there is a business man throughout the country who will dispute the assertion that real progress toward better business conditions, broader markets and price improvement has been made during the past six months—that a genuine upward thrust has been achieved. Moreover, even better things seem to lie ahead. With people returning to work, more money in pay envelopes and a large increase in the number of envelopes, and, above all, with sentiment vastly improved by a revival of confidence, there seems every reason to believe industry and trade will forge on to a vastly improved situation than has been seen in the last several years.

Demand for paper has let down along with that for most other manufactured commodities. This was to be expected because paper is consumed in so numerous branches of industry and trade that the scope of the paper market always is dependent on conditions prevailing in other industries. At the same time, the paper industry is comparatively well occupied. From nearly all manufacturing centers come reports of paper and board mills operating at fair ratios of capacity; of orders being received warranting production on a scale comparing favorably with any period during the last half-year, and of signs pointing to the development of demand on a broadening scale in the weeks to come. A large majority in the industry anticipate excellent business in paper of various kinds over the next several months; there are some, in fact, who are so bullishly inclined they are predicting one of the best periods of market activity between the present and up to the close of the year the industry has ever experienced.

The paper industry is rapidly reaching the stage of adjustment under the provisions of the NRA. Labor and wage schedules under the codification of industry have been put into effect in practically every paper and board mill in the country, and codes covering the industry as a whole and the various groups or units within the industry will soon be approved by Washington and become officially operative. Prices appear to have about reached a full degree of readjustment under the higher costs of manufacturing created by the NRA. Changes in mill quotations in recent weeks have been of narrow dimensions, the sharp advancement seen in most lines of paper for a time has apparently ceased; while the upward movement has halted, manufacturers nevertheless are adhering firmly to quoted prices, and concessions of almost any character are entirely out of the picture. Opinion is common in manufacturing circles that additional changes likely to occur over the next few months will surely be in an upward direction.

Although actual figures are not available, it appears a certainty that production of paper and board from an aggregate standpoint has mounted considerably during the last few months. According to the information to be had, statistics for this year will show an appreciable rise in paper output over 1932. This, of course, is in line with the production trend in practically all manufacturing industries. There has been a lot of paper and board produced and marketed in the past three or four months; most estimates made within the industry are that production has increased by fully 20 per cent over a year ago. It is probable some of this larger production now is in inventories of mills, consumers or converters, but it seems certain the greater portion of the paper produced has moved into consumption.

Production of newsprint in the United States and Canada in August registered a marked rise. The total in both countries reached 278,783 net tons, according to the News Print Service Bureau, which compared with 259,869 tons in July this year and 237,448 tons in August a year ago. The Canadian output was the largest since May, 1931, while production in the United States was higher than in any month since June, 1932. The United States production was 84,521 tons, against 79,482 tons in the preceding month and 79,529 tons in August, 1932, while the Canadian total amounted to 194,262 tons in August, contrasted with 180,387 tons in July this year and 157,919 tons in August last year.

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◆ Toledo Scale Conducts Industrial Exhibits

To acquaint industry with the improvements that are continually being made in its special devices and standard scales, the Toledo Scale Company is conducting a series of industrial exhibits throughout the country.

To date, such exhibits have been made in New York, Detroit, Philadelphia, Buffalo, and Chicago.

The purpose of these exhibits is to bring to the attention of industry, the results of the company's practical research. In every case, executives have welcomed the opportunity to learn of the latest developments in weighing equipment, and this enthusiastic reception influenced the Toledo Scale Company to continue these displays and to build a special truck to make them available to a greater number of cities.

◆ BOARD COVERS to take the place of straw envelopes for protecting bottles are being developed by a British firm, according to a recent issue of "THE WORLD'S PAPER TRADE REVIEW" (London). The packing will also be suitable for eggs, electric bulbs, preserves, and other forms of fragile articles. The board used for these covers will be either grayboard or strawboard, both readily obtainable in the United Kingdom. The board is moulded into the shape of the article to be packed and it is claimed to be far superior to the straw envelopes at present in use. Of the latter, some 200,000,000 are said to be required annually for the export and domestic trade. The new packing is reported to be uniform, labor-saving, and cleaner than straw, and is waterproof, thus insuring that if breakage should occur the remainder of the case would be unaffected. It is reported by some of the large users on the Continent, however, that their breakages have been reduced 75 per cent.

Domestic RAW MATERIALS

◆ Papermaking Rags

The recent trend of prices on some classes of papermaking raw material has been in favor of buyers; that is, the market has eased to some extent and paper manufacturers have been enabled to acquire the supplies desired at lower costs. On the other hand, prices of some materials not only are firm decidedly but show an advancing tendency, after having registered additional rise during the last few weeks.

Following the broad buying by paper mills in the early summer period, demand for papermaking rags has slowed down very perceptibly. Several reasons are ascribed for the quieter market. One is that most paper manufacturers who use rags have accumulated ample stocks to last them for a while, and are not in want of further supplies and consequently are not buying. Substantiating this are figures compiled by the U. S. Department of Commerce which show that importations of rags for papermaking purposes into this country in the month of July amounted to no less than 16,659 net tons. This is a lot of rags; as illustrative of how large a quantity it is, it is only necessary to say that during the full first six months of the current year importations totaled but 19,968 tons, so that in the course of a single month almost as many papermaking rags were imported as in the previous six-month period. Thus, it seems very likely paper mills have stocked up with rags on a fairly large scale.

Another reason for the falling off of demand is that since market prices advanced to much higher levels a few months back, the conservation and collection of rags all over the country has increased, thereby enlarging the supply available in the market and eliminating apprehension among papermakers that should they have need of larger supplies they might experience difficulty getting the rags required. Also, with prices on the downslide, as they have been in recent weeks, paper manufacturers have retrenched in their purchasing, as is their usual wont on a declining market.

Generally speaking, new cuttings are firmer in price than old rags. Roofing stock, the lowest grade of old rags, has dropped fairly sharply in price, and has brought other grades of old rags down with it; on the other hand, dealers are holding stocks of new cuttings quite steadily; there is a readiness to sell manifested, of course, but dealers are bent on procuring at least certain prices and are not much disposed to part with cuttings unless getting the values desired. Moreover, production of new rags is comparatively light, and costs of such rags at cutting-up sources have risen appreciably, all of which has influence in sustaining market price levels of cotton and linen cuttings.

New York dealers are asking 7 cents per pound f. o. b. that city for No. 1 new white shirt cuttings, while new unbleached muslins are quoted at 7.25 to 7.50 cents, light silesias at 4.75 cents, light flannelettes at 5 cents, fancy shirt cuttings at 2.75 to 3 cents, blue overall cuttings at 4.50 cents, bleached canton flannels at 6.25 cents, washables at 2.25 cents, and bathrobe cuttings at 2.50 cents. Old No. 1 white cottons of repacked quality are priced at around 3 cents a pound f. o. b. dealers' shipping points, depending on the quality of packing, and it is stated sales for export to Europe have fairly cleared the market of these rags. Repacked No. 2 whites are about 2 cents a pound, repacked thirds and blues 1.30 to 1.40 cents, and repacked twos and blues 1.50 to 1.60 cents. Roofing rags have declined to where purchases by mills have been reported in the East at 65 to 70 cents per hundred pounds for No. 2 stock and 80 to 85 cents for No. 1 roofing stock f. o. b. shipping points.

◆ Old Paper

The important happening in the old paper market has been a sharp; in fact, a very sharp decline in prices of No. 1 old mixed paper. The market, more especially in the East, has dropped to where prevailing prices are now 50 per cent below the levels of only a few weeks ago. Mixed paper is selling in New York to boxboard and other mills at 40 cents per hundred pounds f. o. b. that city. The decline in mixed paper has brought some of the other grades of waste paper down with it. Folded news is 65 cents per hundred pounds in the East f. o. b. shipping points, old corrugated boxes 55 cents, dry goods waste 45 cents, container manilas 50 cents, and overissue newspapers 85 cents. Higher prices than these, however, rule in the Middle West. Shavings are relatively steady with Yew York dealers reporting sales to mills at around 2.35 cents a pound for No. 1 hard white, 2.20 cents for No. 1 soft white, 2.40 cents for one-cut soft white shavings, and 2.75 cents for No. 1 hard white envelope cuttings. Heavy No. 1 book stock is 1.05 to 1.10 cents a pound at dealers' shipping points, crumpled books 90 to 95 cents per hundred pounds, old No. 1 kraft paper 1.10 cents a pound, white ledgers 1.25 cents, and colored ledger stock 1.10 cents.

◆ Pulpwood

Demand for pulpwood is reported increasing and a steady undertone marks quotations. Prices prevailing in the up-State New York district are $13.50 per cord for four-foot peeled wood, $17.50 to $18 for rossed, and $15.50 for hand-shaved.

◆ Rope and Bagging

Paper mill demand for old rope has come to an almost complete standstill. Rope paper manufacturers evidently have sizable supplies of old rope on hand, as a result of fairly heavy purchases some time ago, and also are somewhat apprehensive over the possibility of a compensatory tax being imposed on rope paper products to offset the processing tax on cotton, and therefore are refraining from adding to their raw material stocks until the tax question is settled. Prices of old rope are largely nominal although quotably unaltered at 2.50 cents or slightly higher per pound at dealers' shipping points for No. 1 domestic and 2.25 to 2.40 cents ex dock American Atlantic ports for No. 1 foreign old manila rope.

◆ Mechanical Pulp

Notwithstanding that heavy rainfalls in nearly all grinding districts have swollen mill streams and enabled grinders to operate freely, offerings of groundwood pulp are not large, most of the tonnage reaching the market is being readily taken up by consumers, and a firm tone characterizes prices. Domestic and Canadian groundwood is bringing $35 or thereabouts per ton delivered consuming mill centers, depending of course on the distance between the consumer and producer of the pulp. Canadian grinders are securing $21 and $22, and sometimes higher, for prime groundwood f. o. b. their mill points, while domestic manufacturers are realizing well above these prices on a f. o. b. pulp mill basis, depending on the haul to consuming plants. Offerings of groundwood from Europe are very limited.

◆ Chemical Pulp

Firmness is the cardinal characteristic of the chemical pulp market. Prices are strong, and tending higher. Domestic manufacturers with few exceptions are reported sold up for some time ahead and showing little disposition to accept additional orders. It is a fact, so reports state, that many producing mills are refusing flatly to enter further selling commitments, having sold all the pulp they care to commit themselves on and apparently expecting higher prices. Domestic bleached sulphite is scarcely obtainable under 3 cents a pound, ex dock Atlantic seaboard basis, and some producers are quoting beyond this price. Unbleached sulphite is 1.75 to 2 cents f.o.b. pulp mills and some brands range above 2 cents, while domestic bleached soda pulp is firm at 2.50 cents delivered book paper mills. Kraft pulp of domestic origin is about 2 cents at pulp mills for No. 1 eastern kraft and 1.75 cents for southern kraft pulp.

◆ Chemicals

Steadiness marks prices of papermaking chemicals, and some items tend upward. The one exception is casein, quotations on which have eased to 14 cents a pound on the standard ground and 15 cents on the finely ground domestic, and 13.50 to 14.50 cents on Argentine casein.

Import and Export MARKETS

EXPORTS

Exports of paper and paper products from the United States continued to show at least a fair increase, in point of total value, during the month of July last over the shipments in the preceding month. Total exports in July were valued at $1,259,668, according to official statistics issued by the U. S. Department of Commerce, contrasted with $1,132,546 in June this year, and $1,202,860 in July, 1932. Exports for the first seven months of the current year reached a value of $7,802,469, contrasted with $9,736,959 in the same period of 1932.

Exports of newsprint paper during the first seven months of this year amounted to 11,436,512 pounds, valued at $225,121. Uncoated book paper shipments from this country in the seven-month period were valued at $453,495, while wrapping paper exports were valued at $699,139, and writing paper exports were of a value of $471,835. Exports of sheathing and building paper in the seven months were valued at $84,164, tissue and crepe paper $306,309, cover paper $58,541, toilet paper $289,454, blotting paper $80,930, and hanging paper $42,639. Exports of boxboard, including paper and strawboard, reached a value of $496,661, and other paperboard shipments were valued at $365,288. Paper bag exports were valued at $305,253, paper box exports at $259,940, and envelopes at $74,816.

Exports of paper base stocks, comprising wood pulp, rags, etc., were valued at $1,890,620 in the first seven months of this year, contrasted with shipments of a value of $1,736,234 in the similar period of 1932.

IMPORTS

◆ Wood Pulp

Continued firmness of a very pronounced degree is observable in the market for imported wood pulp. From both a price and supply standpoint the situation is firm indeed, and the market is gradually strengthening—slowly, yet creeping toward higher price levels and a tighter supply condition. Moreover, further advancement in Scandinavian and other European exchanges has helped push pulp prices upward, higher exchange having constituted a very important factor in the market's rise recently.

Several circumstances of bullish character, and very well defined, exist in the foreign pulp situation, and are chiefly responsible for the firm tone of the market. One is that producers in Scandinavia are sold out for the rest of this year, having scarcely no more tonnage to dispose of for the balance of this shipping season or until the Baltic is due to freeze over for the winter, and are not a bit eager to sell farther ahead. The Europeans apparently are resolved that some measure of inflation will be instituted in the United States, which will lead to further depreciation of the dollar and additional rise in European currency exchanges, and, believing this is sure to materialize, are obviously indisposed to sell pulp for shipment next year. There has been some business contracted in 1934 deliveries of pulp but it has been of limited volume, not because consumers in the United States have not been ready to buy but because producers abroad have been unwilling to sell.

Another factor of importance in the situation is that pulp consumption has increased, not only in this country but elsewhere. England is consuming more pulp, consumption in other European countries is rising, even in the Scandinavian countries and Germany and other pulp-producing nations consumption is mounting. As against this, pulp manufacturers in Europe are working under agreement to restrict production, and from all visible indications, consumption the world over has risen to where it now closely approximates the current output. It is no exaggeration whatever to say that American consumers are experiencing decided difficulty effecting purchases of foreign pulp. Many paper manufacturers stand ready to place contracts for sizable tonnages for 1934, but producing mills in Sweden, Norway and Finland are very reluctant to sell for next year; in fact, offerings are so slim that it can be accurately stated almost no supply is in the market for 1934 shipment. Pulp for current shipment from abroad also is exceedingly scarce, simply because producers are sold out for the remainer of this year, while available spot supplies are exceedingly limited.

Strong unbleached sulphite of prime quality and of foreign origin has been sold at 2.10 and 2.15 cents per pound, ex dock American Atlantic seaboard. Many in the trade now regard 2.10 cents as the bottom of the prevailing price range on such pulp, and it is not easy to locate supplies at this price. Quotations on imported prime bleached sulphite range from about 2.85 cents upward, ex dock New York or other Atlantic ports, though most of this pulp now offering is held at 3.00c as a minimum and this latter figure is rapidly becoming the recognized market basis. Prime Scandinavian kraft pulp is about 1.85 or 1.90 cents a pound at seaboard, and some in the trade report less of such pulp offered than sulphite. Imported groundwood is scarcely offered also, and is quoted at $28 to $29 per short ton, ex dock American Atlantic ports, for dry pulp.

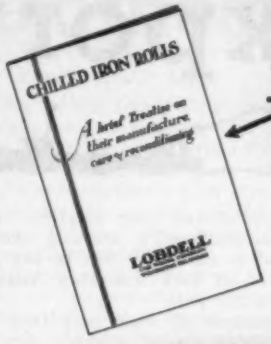
Importations of wood pulp into the United States scored a sharp gain in July last as compared with previous months this year, and, in fact, constituted one of the biggest month's imports ever recorded in the trade's history. A total of 159,463 long tons of chemical pulp, valued at $5,283,519, was imported in July, according to official U. S. Department of Commerce statistics, contrasted with 122,518 long tons of a declared value of $4,020,995 imported in the preceding month, and representing almost three times the tonnage and value of imports of 54,578 tons of a value of $2,075,424 in July last year.

◆ Paper Stock

Reflecting the upturn in mill purchasing during the late spring and early summer, imports of rags for papermaking into the United States during July were more than double the tonnage received in the month before, reaching a total of 33,319,061 pounds, valued at $230,286, against 16,284,059 pounds of a value of $126,687 in June last, according to U. S. Department of Commerce figures. Imports in the first seven months of this year amounted to 73,256,496 pounds of a declared value of $525,552, compared with 56,852,981 pounds of a value of $754,137 in the same period of 1932. Imports of miscellaneous paper stock in July were 17,108,565 pounds, valued at $147,216, contrasted with 9,371,660 pounds of a value of $92,081 in the preceding month, and making a total for seven months this year of 54,868,767 pounds of a value of $513,518, against 55,504,868 pounds of a value of $474,130 in the same time of 1932.

◆ Paper

Imports of paper into the United States showed an increase, in point of value, in July as contrasted with the preceding month, according to official figures issued by the U. S. Department of Commerce. The total value of paper imports in July was $7.039,154, compared with $6,122,148 in June this year and $7,348,414 in July last year. Imports during the first seven months of the current year were valued at $41,379,664, compared with $58,116,442 in the similar period a year ago. Standard newsprint, to the value of $6,283.615, was the principal item of import in July last, with cigarette paper to the value of $271,911 the second most important class of paper imported.



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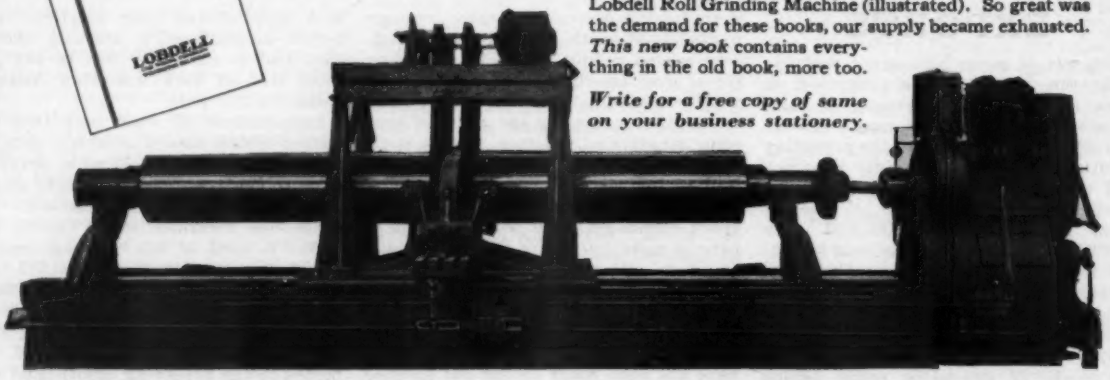

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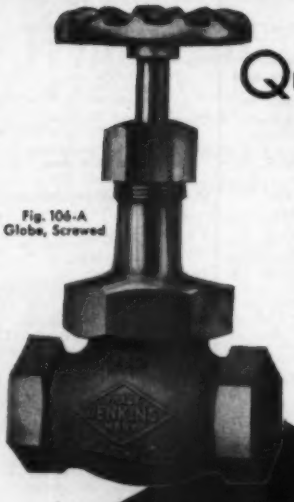

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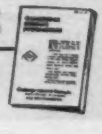

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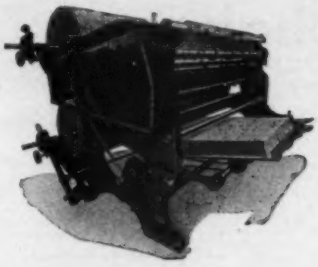

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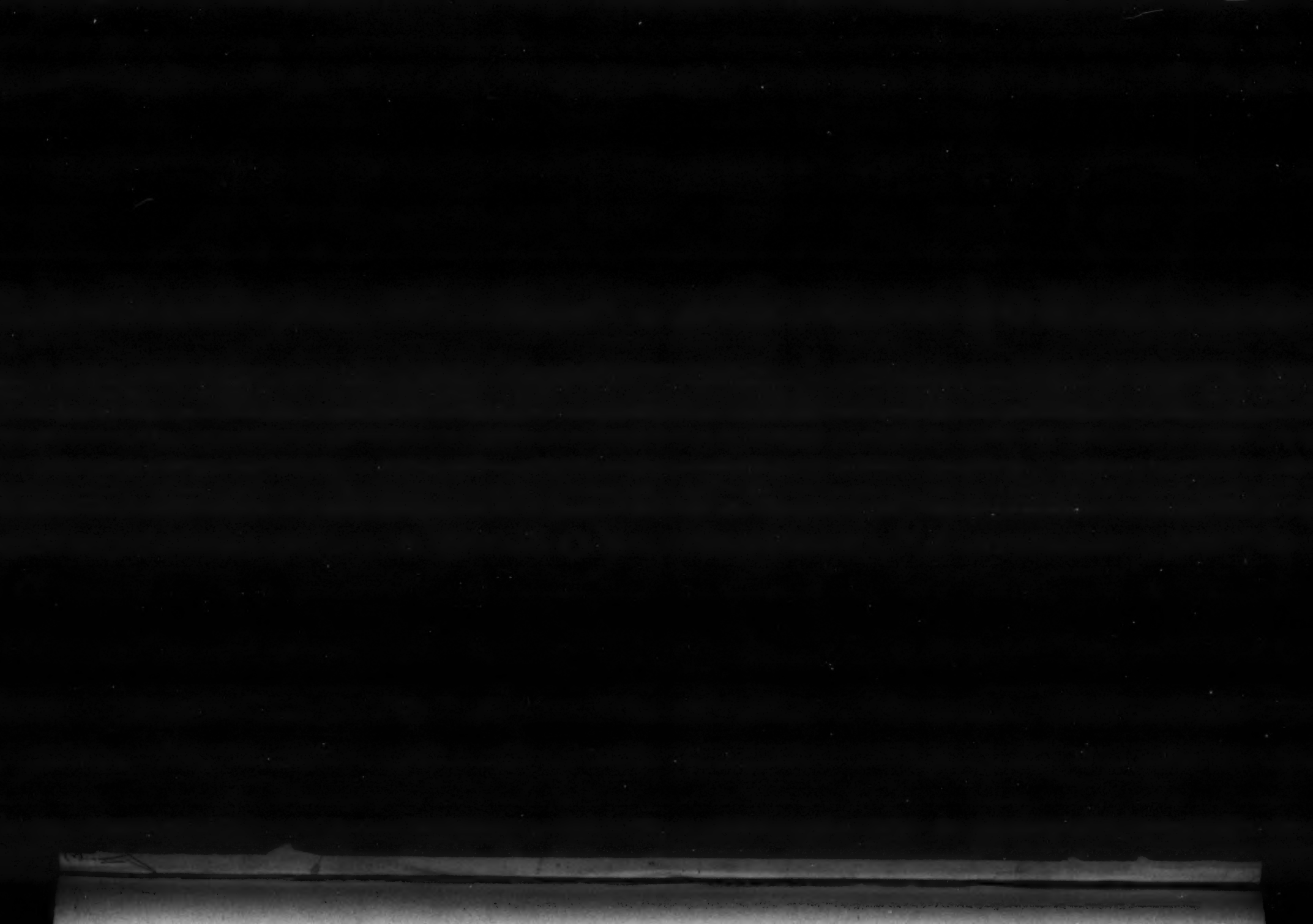
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